This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

LL

KF 26
.C6
1918a
pt. 8
Copy 4

THE LIBRARY OF CONGRESS
1800

U. S.

UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION

HEARING

BEFORE THE

COMMITTEE ON COMMERCE
UNITED STATES SENATE

SIXTY-FIFTH CONGRESS

THIRD SESSION

PURSUANT TO

S. RES. 170

DIRECTING THE COMMITTEE ON COMMERCE TO INVESTIGATE ALL MATTERS CONNECTED WITH THE BUILDING OF MERCHANT VESSELS UNDER THE DIRECTION OF THE UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION AND REPORT ITS FINDINGS TO THE SENATE, TOGETHER WITH ITS RECOMMENDATIONS THEREON

EXCHANGE
62
JUL 29 1944
Serial Record Division
The Library of Congress
Copy

TESTIMONY OF

MR. MATTHEW C. BRUSH

PRESIDENT OF THE AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION

Printed for the use of the Committee on Commerce

PART 8

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

U. S. Congress. Senate. Committee on commerce.

UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION

HEARING

BEFORE THE

COMMITTEE ON COMMERCE
UNITED STATES SENATE

SIXTY-FIFTH CONGRESS

THIRD SESSION

PURSUANT TO

S. RES. 170

DIRECTING THE COMMITTEE ON COMMERCE TO INVESTIGATE ALL MATTERS CONNECTED WITH THE BUILDING OF MERCHANT VESSELS UNDER THE DIRECTION OF THE UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION AND REPORT ITS FINDINGS TO THE SENATE, TOGETHER WITH ITS RECOMMENDATIONS THEREON

JANUARY 30, 1919

Printed for the use of the Committee on Commerce

PART 8

WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

HE745
.A2
1919
copy 4

COMMITTEE ON COMMERCE.

DUNCAN U. FLETCHER, Florida, *Chairman.*

GEORGE E. CHAMBERLAIN, Oregon.
JOSEPH E. RANSDELL, Louisiana.
MORRIS SHEPPARD, Texas.
JAMES K. VARDAMAN, Mississippi.
JOHN K. SHIELDS, Tennessee.
THOMAS S. MARTIN, Virginia.
JOHN H. BANKHEAD, Alabama.
FURNIFOLD McL. SIMMONS, North Carolina.
JAMES A. REED, Missouri.
WILLIAM F. KIRBY, Arkansas.

KNUTE NELSON, Minnesota.
WILLIAM ALDEN SMITH, Michigan.
WESLEY L. JONES, Washington.
LAWRENCE Y. SHERMAN, Illinois.
WARREN G. HARDING, Ohio.
BERT M. FERNALD, Maine.
WILLIAM M. CALDER, New York.
HIRAM W. JOHNSON, California.
IRVINE L. LENROOT, Wisconsin.

WILLIAM L. HILL, *Clerk.*
ALBERT H. ROBERTS, *Assistant Clerk.*

LIST OF ILLUSTRATIONS.

YARD.

Page.

Panorama, January 24, 1919, and September 20, 1917 ..... Frontispiece
Storage yards:
- Hull steel storage yard A 286–287
- Hull steel storage yard B 289–290
- Pipe yard in storage yard C 291
- Hull fittings in storage yard C 292–293
- Hull fittings in storage yard D 295
- Ship outfitting, storage yard D 296
- Turbines and gears, storage yard D 297
- Liner bins, storage yard E 298
- Hull steel storage yard F 288

Warehouses:
- Typical wooden warehouse 300
- Interior of concrete general warehouse (nearing completion) 301
- Concrete general warehouse 302
- Pipe-fittings storage rear of warehouse No. 20 299

SHIPS.

Delivered:
- Quistconck, hull No. 492 231
- Sacandaga, hull No. 494 235
- Saccarappa, hull No. 495 232
- Sac City, hull No. 493 233
- Saguache, hull No. 499 237

In wet basin:
- Prusa, hull No. 498 245
- Saco, hull No. 496 243
- Sahale, hull No. 500 246
- Sagaporack, hull No. 497 244
- Saluda, hull No. 501 242
- Sapinero, hull No. 503 239
- Saucon, hull No. 506 247
- Saugerties, hull No. 507 240
- Schodack, hull No. 512 241

SHIPWAYS.

Ways group No. 1 ..... First insert between 248–249
Ways group No. 2 ..... Second insert between 248–249
Ways group No. 3 ..... Third insert between 248–249
Ways group No. 4 ..... Fourth insert between 248–249
Ways group No. 5 ..... Fifth insert between 248–249
View looking north and east from shipway No. 1 250
River front view of shipways Nos. 1 to 50 251
Forest of derrick booms to serve the shipways 252
Day view of the shipways at work 272
Night view of the shipways at work 273

CHARTS.

Allied cargo shipping—Construction and losses since beginning of the war (File No. X–3) 358
A and B boats compared with Submarine Corporation boat (File No. W–18) .. 275
General plan of Hog Island shipyard (File No. W–55) 225
The Hog Island terminal (File No. W–59) 393
Progress diagram of each ship after launching, January 29, 1919 (File No. W–54). 253

Page.
Arrangement of materials in storage yard C (File No. W–35–A)..... 284
Places in the United States from which materials were shipped to Hog Island (File No. W–48)..... Insert between 306–307
Record of keels laid and ships launched, first 50 A ships (File No. F–2)..... 262
Routes of steel from mills to fabricators and fabricators to Hog Island (File No. W–16)..... Insert between 302–303
Arrangement of steel storage yard A (File No. W–35–B)... Insert between 284–285
Hog Island compared to 12 other shipyards (File No. W–19)..... 359
Comparison of weather conditions, winter of 1917–18 and winter of 1918–19 (File No. X–5)..... 342
Progress of ship constructions, January 30, 1919 (File No. F–1). Insert between 260–261

PHOTOGRAPHS SHOWING PROGRESS OF CONSTRUCTION IN CHRONOLOGICAL ORDER.

Cutting the brush for survey lines, September 20, 1917..... 313
Construction of concrete ways, group No. 2, December 2, 1917..... 314
Ways group No. 1, looking southwest, December 2, 1917..... 316
Ways groups Nos. 3 and 4, looking east, December 2, 1917..... 317
Pile drivers at work, ways group No. 1, December 2, 1917..... 318
Main water and sewerage trench, December 22, 1917..... 319
Looking west from ways group No. 3, January 5, 1918..... 320
Looking west from ways group No. 3, January 15, 1918 } Insert between 320–321
Looking east from ways group No. 4, December 21, 1917 }
Wet basin section, dredging under difficulties in arctic weather, January 5, 1918 321
Second Street looking east, January 6, 1918..... 322
Noontime scene at temporary mess hall No. 1, January 17, 1918..... 323
Shipways Nos. 1, 2, 3, and 4 of ways group No. 1, January 22, 1918..... 324
Compressor house No. 1 and ways group No. 1 looking south from Second and E Streets, January 23, 1918..... 325
Airplane view main wharf and ways group No. 1, January 25, 1918..... 326
Looking northeast from central fire station, January 30, 1918..... 327
Live-steam method of thawing ground before excavating, February 2, 1918.... 328
Steam shovels grading Front Street, February 2, 1918..... 329
Ways groups Nos. 4 and 5, looking east, February 2, 1918..... 330
Typical steel caisson driven at toe of shipway No. 41, February 7, 1918..... 331
Excavating to grade, ways group No. 5, February 7, 1918..... 332
Excavating to grade in front of ways group No. 1, February 12, 1918..... 333
Excavating to grade on Front Street, February 13, 1918..... 334
Excavating to grade, storage yard B, February 13, 1918..... 335
Excavating to grade, north of ways group No. 2, February 13, 1918..... 336
Dynamite storage (used in excavation work), February 23, 1918..... 337
Heavy hauling for the steel horse, February 27, 1918..... 338
Looking northeast from ways group No. 4, March 11, 1918..... 339
Pile drivers at work, ways group No. 3, March 16, 1918..... 340

BUILDINGS.

Record building..... 304
Section of timekeeping office, records building..... 305
Bank building..... 309
Telephone building..... 312

SHOPS.

Interior of plate and angle shop..... 310
Shop group in background..... 311

MISCELLANEOUS.

Blotter advertising sailing of Sacandaga..... 236
Model of 7,500 dead-weight tonnage A cargo ship..... 255
Model of 8,000 dead-weight tonnage B troop and cargo ship..... 256
Launching of the Schodack from way No. 12, January 18, 1919..... 260
Typical riveting gang..... 266
Forty-five locomotive cranes..... 308
The first war veterans to be employed at Hog Island..... 352

No. 1.—WEST—SAME

LF OF

UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION.

THURSDAY, JANUARY 30, 1919.

UNITED STATES SENATE,
COMMITTEE ON COMMERCE,
Washington, D. C.

The committee met, pursuant to call, in the committee room, Capitol, at 10.30 o'clock a. m., Senator Duncan U. Fletcher presiding.

Present: Senators Fletcher (chairman), Ransdell, Vardaman, Bankhead, Kirby, Nelson, Jones, Fernald, Lenroot, and Johnson.

The CHAIRMAN. The committee will now hear the president of the American International Shipbuilding Corporation. Mr. Brush, will you state your business and past experience?

STATEMENT OF MR. MATTHEW C. BRUSH, PRESIDENT OF THE AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION AND VICE PRESIDENT OF THE AMERICAN INTERNATIONAL CORPORATION.

Mr. BRUSH. I am president of the American International Shipbuilding Corporation and vice president of the American International Corporation.

Do you want me to start in and tell my story, Mr. Chairman? You said something about experience. Do you want me to give some indication of what I have done previous to assuming the duties of the president of the American International Shipbuilding Corporation?

The CHAIRMAN. Yes; give your experience and training.

Mr. BRUSH. Previous to my presidency of the American International Shipbuilding Corporation, I was president of the Boston Elevated Railway Co. for two years, and prior to that, I was vice president and assistant to the vice president of the same company for six years. Previous to that, I was general manager of a steam railroad, and an electric railway in western New York. Previous to that I was vice president and general manager of an electric railway in Massachusetts. Previous to that, I was in western Kansas, in charge of shops and roundhouses, for the Rock Island Railroad. Previous to that, I was a roundhouse foreman at Council Bluffs, Iowa, for the Union Pacific Railroad, and I also served as an apprentice boy on the same railroad.

Previous to that, I graduated from the Massachusetts Institute of Technology. Previous to that, I went to Armour Institute in Chicago, to prepare for the Massachusetts Institute of Technology. Previous to that, I went to high school in Chicago and to high school in Minneapolis. Previous to that, I went to grammar school in Winona, Minn., and Stillwater, Minn.

Senator NELSON. So you are a native of Minnesota, are you?

Mr. BRUSH. I am a native of Stillwater, Minn.

Senator KIRBY. Does that comprise your entire experience before you were connected with the Hog Island shipyard?

Mr. BRUSH. I am not a shipbuilder.

The CHAIRMAN. Whom did you succeed at Hog Island?

Mr. BRUSH. I succeeded Mr. Frederick Holbrook.

The CHAIRMAN. When did you go there?

Mr. BRUSH. On December 13, 1918.

The CHAIRMAN. Just state what you found there, and what the conditions are there at the present time, in your own way. I think we will save time if we allow you to go on with your statement, and then we can cross-question you afterwards.

Mr. BRUSH. If I may, Mr. Chairman, I shall be glad to proceed in that way.

I understand that you are anxious to have this done in as short a time as possible, and I will try as well as I can not to waste your time. If I may continue and go through my statement very promptly, I shall be glad to answer any questions, if I can; but I think I can save your time, and the time of the committee as a whole, if I may do that.

Senator VARDAMAN. When did you take charge at Hog Island?

Mr. BRUSH. On December 13, 1918, about seven weeks ago.

In order to give you a picture of Hog Island, I have here a panoramic photograph taken on January 24, 1919; and also one taken on November 29, 1918, and back of that, one showing the situation as it existed on September 20, 1917.

Naturally, I was in very much the same situation, when I went to the property, that I assume you gentlemen are now; I wanted to know what I had, what I had to do there, and what I had to do it with. And at the same time I have been trying to prepare this information for the committee in such a way that it would be of some service, and I hope of some interest to you.

This chart shows the general plan of the Hog Island shipyard as it exists to-day, and it is submitted for the information of the committee. [See illustration, p. 225.]

I have several panoramic photographs to show the committee, Mr. Chairman.

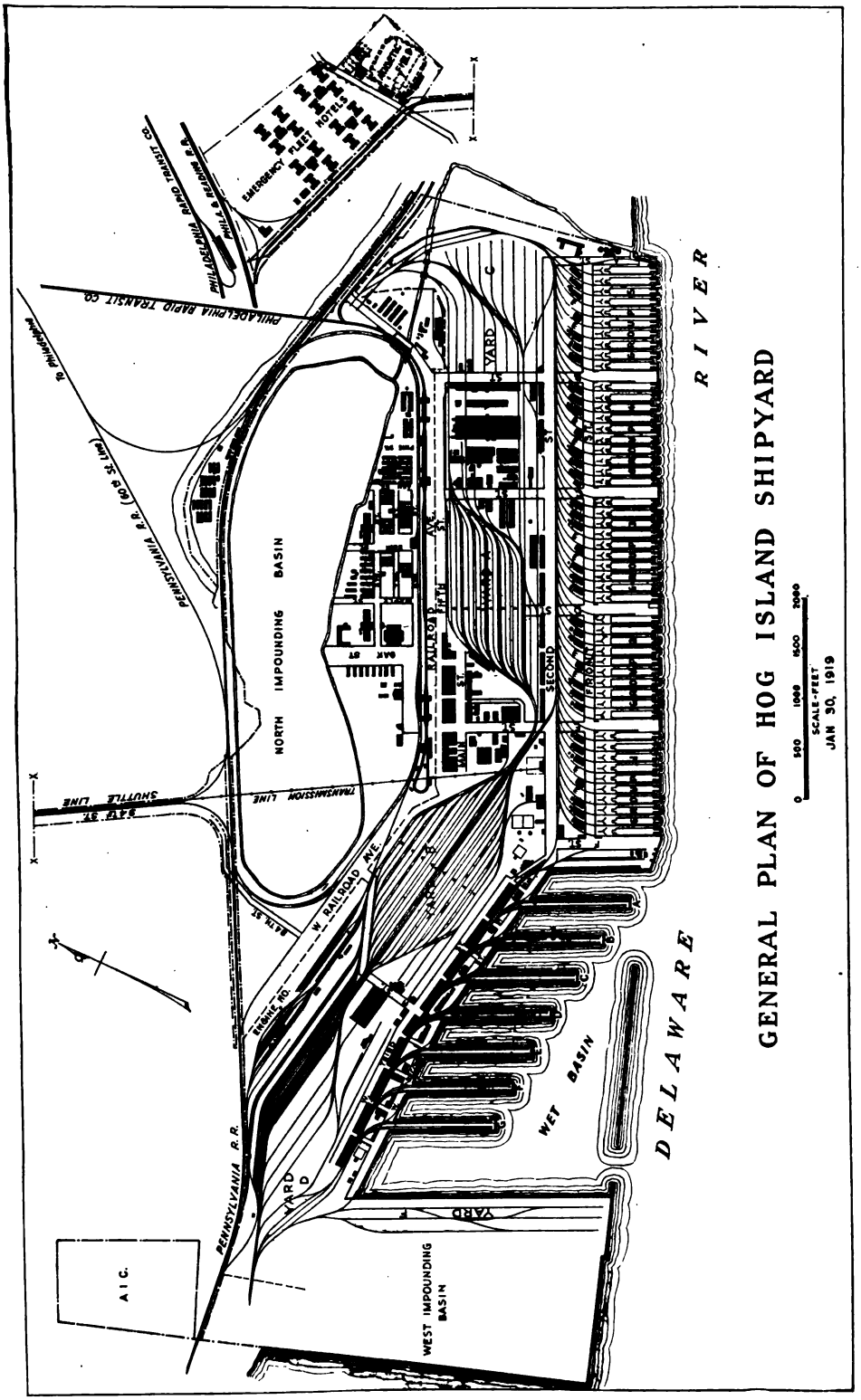
The first one [indicating] shows, on the left, the entire yard, with the 50 ways. On the right it shows the wet basin, with 11 ships in it. This was taken a week ago to-morrow—January 24, 1919. [See frontispiece.]

The panorama now spread out before you was taken on November 29, 1918. This is exactly the same view as the one just shown you, on that date. It shows six ships in the wet basin. The first one, that camouflaged ship, being the *Quistconck*, is the only one that was camouflaged, prior to the signing of the armistice. Otherwise, the picture is the same.

This last panorama [indicating] is a picture of Hog Island as it existed on September 20, 1917 [see frontispiece], this is 491 days previous to a week ago last Friday, January 24, 1919, the date the last photograph was taken. That gives you some conception of the situation, in a pictorial way.

The CHAIRMAN. Where is the wet basin?

Mr. BRUSH. The panoramic photograph shows the wet basin to the right in the pictures of November 29, 1918, and January 24, 1919 [see frontispiece, view No. 6], and this photograph of Septem-


GENERAL PLAN OF HOG ISLAND SHIPYARD
SCALE-FEET
0 500 1000 1500 2000
JAN 30, 1919
DELAWARE RIVER
WET BASIN
NORTH IMPOUNDING BASIN
WEST IMPOUNDING BASIN
PENNSYLVANIA R.R.
PHILADELPHIA RAPID TRANSIT CO
PHILA. & READING R.R.
EMERGENCY FLEET HOTELS
YARD
SHUTTLE LINE
TRANSMISSION LINE
W. RAILROAD AVE.
BRIDGE RD.
BAILEY
FIRST
SECOND
A.I.C.

ber 20, 1917 [see frontispiece, views Nos. 2 and 3], was taken from the water's edge about the center of what is now shipways group No. 3 with the photographer's back to the river. There was, of course, no tower at that time—September 20, 1917.

The view in the upper left-hand corner of the panoramic picture [view No. 1] is the same as the west one-half of the panoramic view of September 20, 1917 [view No. 2]. It was taken on September 27, 1917, and indicates to you the progress that was made in one week's time.

The view in the upper right-hand corner [view No. 4] is the same as the east one-half of the panoramic photograph of September 20, 1917 [view No. 3], and was taken October 3, 1917, showing the progress that was made in two weeks' time.

The views of November 29, 1918, and January 24, 1919 [see frontispiece, views Nos. 5 and 6], were taken from the tower built for that purpose which is immediately north of Pier M.

The CHAIRMAN. Is this looking from the Delaware River?

Mr. BRUSH. No; you are looking east there in that picture.

Senator KIRBY. Was this swamp land at that time?

Mr. BRUSH. Yes, sir; it was largely swamp land then.

Senator VARDAMAN. That picture shows the condition of the island——

Mr. BRUSH (interposing). When the contract was signed.

Senator VARDAMAN. And when the estimate of a cost of $21,000,000 was made?

Mr. BRUSH. Yes, sir.

I felt that the first thing which interested me more than anything else when I got there was, whether we were building ships, and if so, when they would be built. I had read a great deal about the *Quistconck* being towed around from one dock to another, and being put in dry dock; and I would like to tell you gentlemen the actual facts in regard to the *Quistconck*——

Senator JONES (interposing). Let me ask you this question first: I saw in the newspapers a short time ago that the *Tuckahoe* was in a sinking condition, and had to be towed into port.

Mr. BRUSH. The *Tuckahoe* was built in the New York Shipbuilding plant, not in the Hog Island plant. I happen to know something about it, but we had nothing to do with it.

Senator JONES. I thought that was built at Hog Island.

Mr. BRUSH. No, Senator; the *Tuckahoe* was built at Camden, N. J.

The CHAIRMAN. And how many days did that delay her?

Mr. BRUSH. I do not know how many days she was delayed at Halifax—she is the ship that was built in 27 days. I do happen to know something about the situation. She was not towed into Halifax in a leaky condition, as was reported, but steamed there herself. I understand she is now all right and at sea again.

Senator NELSON. Was she a fabricated ship?

Mr. BRUSH. Yes, Senator; she was a fabricated ship.

Senator JONES. Do you know the cause of her leaky condition?

Mr. BRUSH. She was not in a leaky condition. She had trouble with her ash ejector but her hull was in good shape.

The CHAIRMAN. She was launched how long ago—do you know?

Mr. BRUSH. I do not remember when she was launched. Mr. Knight can probably tell you.

Mr. KNIGHT. Last May.

Mr. BRUSH. This model, Mr. Chairman [indicating model of ship on committee table] is the exact counterpart of the 110 ships, which we call our class A ships, for which we have a contract with the Emergency Fleet Corporation to build. [See illustration, p. 255.]

Senator JONES. What is the tonnage of those ships?

Mr. BRUSH. Seven thousand five hundred dead-weight tons, and the *Quistconck* is the exact duplicate of that model. [See illustration, p. 255.]

The keel of the *Quistconck* was laid on February 12, 1918, and she was launched on August 5; she had her dock trial November 3 and her river trial November 7; she was delivered December 3, 1918, and left Hog Island December 10—and she never has sunk, and never has been in a dry dock.

Senator JONES. What is she doing now?

Mr. BRUSH. Before I answer that question, may I read what Admiral Bowles said, and then I will answer that question if you please.

Admiral Bowles stated, in the hearing before this Committee on January 2, 1919, as follows:

In response to the question asked as to the defects which the *Quistconck* developed after launching and which delayed its final completion, I beg to say that in order to comply with the launching date of the *Quistconck*, arranged sometime in advance, it was necessary to launch the ship before testing oil and water tanks, except so far as related to the skin of the vessel.

Then he goes on and explains what took place.

And in reply to a question addressed to Mr. Piez in that hearing of January 2, as to whether there was any reriveting required in the ship after its launching, Mr. Piez replied, "No," and added:

There was additional riveting required after the launching because the riveting had not progressed far enough. It was a premature launching, because the riveting had not been carried far enough.

Mr. Piez further stated to your committee in that hearing:

Ships are carried through to further state of completion now before being launched. We have had no repetition of that first experience.

And in the same hearing, Mr. Piez said:

We have not had any trouble with the gears and turbines there.

The *Quistconck* proceeded to Norfolk and loaded with a full cargo of coal from Virginia; she left Norfolk January 2, 1919, and went to Cristobal, Panama, and arrived there on January 10, 1919; she unloaded her cargo there, and lay at anchor four or five days, under the orders of the Emergency Fleet Corporation, and then she proceeded from Cristobal to New Orleans, arriving there on January 23, 1919, and she is now at New Orleans, loading for Genoa, Italy; cargo composed of spelter, steel rails, tobacco, and cotton.

Senator KIRBY. Did she make the usual time on the voyages?

Mr. BRUSH. Yes, sir. The ship, when we deliver it, is turned over to the Emergency Fleet Corporation, Operating Division; we receive a receipt for it, and we then have nothing more to do with it.

In this particular case, and for the first few ships that we are delivering, we are making very sure about them, and I, as an engineer, am very much concerned, to have a man of our own on board the ship. As circumstances have worked out in this particular case, we selected a man who had been in charge of the installation of the machinery on the *Quistconck*, from about six weeks after she left the ways until she was accepted by the Emergency Fleet Corpora-

tion. This man was put in charge; he remained on board throughout that work, he remained on board when she was delivered to the Government, he remained on board when she sailed from Norfolk to Cristobal, and from Cristobal to New Orleans. He came back to see me in Philadelphia last night, and due to my being here I had him come to Washington and when he leaves here he is going to return to New Orleans, and go to Genoa. He is in this room now, and I shall be very glad indeed to have him cross-examined by any member of your committee. I have had no conversation with him, except to ask him what he thought of the way the *Quistconck* was working, and he said "Fine." He has been on the ship almost continuously since she has been in the water and I shall be very glad to have him go on the stand and answer any question the committee may ask him.

Senator VARDAMAN. You were not in charge at Hog Island when this premature launching took place, were you?

Mr. BRUSH. No, sir.

Senator VARDAMAN. And you were not in charge at the time of the making of this expenditure of $38,000 which somebody testified was expended in that celebration of that launching?

Mr. BRUSH. No, sir; I was not in charge at that time.

The CHAIRMAN. Is it not a fact that the launching of the ship was directed or controlled by Mr. Schwab, or by the Emergency Fleet Corporation?

Mr. BRUSH. According to the record, Mr. Chairman, the arrangement in regard to the launching was carried out in accordance with the directions of the Fleet Corporation, but was fixed a great many months beforehand and I have been told since I have been there, by Mr. Piez and by Admiral Bowles also, that they believed it was a very wise and expedient thing to do at the time. I personally was not there, and was not even at the launching, Mr. Chairman.

Senator KIRBY. In order that you may not be disturbed by me further while you are speaking from your notes, I wish you would state, when you are talking about these models [indicating models on committee table; see illustrations, pp. 255 and 256] what those ships would cost now, and what they would have cost in the prewar period.

Mr. BRUSH. I can not give you an estimate of what they would have cost in the prewar period. I can give you the present estimated basic cost.

Senator KIRBY. I do not mean to give that now; I mean, in your general discussion.

Senator LENROOT. Before you do that, I wish you would state what rating was given this first ship built at Hog Island.

Mr. BRUSH. The ship itself received the highest rating from Lloyd's and the American Bureau of Shipping. Her equipment was inspected and given the highest rating by the American Bureau of Shipping, of which Commander Taylor is chairman. Lloyd's felt that they could not give the vessel their usual figure for equipment because the welds in a number of the links in her two anchor chains were smaller in diameter than required by Lloyd's rules. So they just did not pass on the equipment. These two anchor chains, as I say, were approved not only by the American Bureau but by the United States steamboat inspectors as well as by the Emergency Fleet Corporation and by Admiral Bowles. They were pronounced satis-

factory by all of them, and if at any time other anchor chains were supplied, Lloyd's would give the figure "1" for the ship and equipment.

There you have the ship [see illustration, p. 255] with 530,000 rivets in it; a ship with 25,000 different pieces in it, and everything approved and pronounced absolutely perfect by Lloyd's and you have a few links in your anchor chains, which are furnished by the Emergency Fleet Corporation to the American International Shipbuilding Corporation, and over which we had absolutely no control, which are delivered to us in the yard, and which we are told by Admiral Bowles to use, which he says are all right, and which the American Bureau of Shipping says are all right—Lloyd's, however, merely said they would let this be sufficient and not pass on the equipment, as they had not tested it nor seen it until it was delivered to the yard.

Senator LENROOT. Did any of your men know that the chains were not all right?

Mr. BRUSH. Yes, sir. We knew that they had been passed by all necessary American boards, but not by British Lloyd's.

Senator LENROOT. Did you protest about it?

Mr. BRUSH. Yes, sir.

Senator LENROOT. Who authorized you to put them on there—Admiral Bowles?

Mr. BRUSH. Yes, sir; and the Emergency Fleet Corporation approved them.

Senator LENROOT. Is the rating "No. 2" that of Lloyd's, or is it that of the Emergency Fleet Corporation?

Mr. BRUSH. It is not rated as No. 2; it is rated at +100A— by Lloyd's, which means that the ship has the highest rating that they give. If they had passed on the equipment they would have inserted the figure "1" after the dash. The average man would not know the difference. All the other ships and the equipment have the highest rating that Lloyd's give any ship, and the highest the American Bureau of Shipping gives, not only on the ship itself but on the entire equipment. Lloyd's only give one class to ocean-going vessels, the highest or none.

Senator LENROOT. At any rate, the reason you did not get the highest rating was not the fault of your corporation, but that of the Emergency Fleet Corporation?

Mr. BRUSH. Yes; if there was fault at all.

Senator JONES. Your company knew that it would reduce the rating of the ships if those links were put in, did it?

Mr. BRUSH. Yes, Senator Jones.

Senator JONES. And you protested about it?

Mr. BRUSH. Yes, sir. As a matter of fact, I do not think it makes any difference. When she arrived at Lewes, Del., on her trial trip at the foot of the Delaware River, Mr. H. C. Higgins, representing the Fleet Corporation, let go the starboard anchor, and backed up, and let go the port anchor, and then tried to pull both anchors up together. I do not believe that a more severe test was ever made, because when the anchors take a grip on the bottom you have got to break your chain, pull up the bottom of the ocean or sink your ship, and these chains held until Mr. Higgins slacked off one chain and took in on the other.

Senator JONES. Well, you did know that Lloyd's required those chains to be perfect, and unless it was done, the ship would not have the rating that it should have, did you not?

Mr. BRUSH. Yes, sir; as to the British rating. The anchor chains were bought, like a great many other things, by the Emergency Fleet Corporation.

Senator KIRBY. Whom did they buy these from?

Mr. BRUSH. I can not answer that offhand.

Senator KIRBY. You do not know who inspected the chains first?

Mr. BRUSH. The American Bureau of Shipping inspected them.

Senator KIRBY. Are they all crooked?

Mr. BRUSH. No; only a few links were unsatisfactory to Lloyd's.

Senator KIRBY. In those two chains there were crooked links and you do not know of any other cases of the kind?

Mr. BRUSH. No, because every other ship that has gone out has received the highest rating that British Lloyd's and the American Bureau give both on the ship and the equipment.

Senator KIRBY. That is all right; I just wanted to know who passed the crooked ones.

The CHAIRMAN. You may proceed.

Mr. BRUSH. There has been so much talk about the *Quistconck* that I think it is only fair for me to make clear to the committee just what the situation was.

That [see illustration, p. 231] is the *Quistconck* just as she was leaving. She is being loaded now at New Orleans for Genoa.

The second ship that was delivered was the *Saccarappa*. The keel of the *Saccarappa* was laid March 26, 1918; she was launched August 24; had her dock trial November 20; her river trial December 22; was delivered December 30, 1918, and left Hog Island December 31, 1918.

She proceeded to Philadelphia; sailed for New York on January 18, 1919; arrived New York January 20 and loaded there with a cargo of general merchandise for Rio de Janeiro, Brazil. She was manned by a crew of Americans and was assigned to A. H. Bull & Co., 17 Battery Place, New York. [See illustration, p. 232.]

Senator KIRBY. Is she the same type of ship as the *Quistconck*?

Mr. BRUSH. Identically the same type of ship. And to-day I received word that the vessel is at Atlantic Basin, Brooklyn, and is expected to sail sometime next week. The next ship was the *Sac City*, which is the same type of ship. All of these class A ships, for which we have a contract, are identically the same. [See illustration, p. 233.]

The *Sac City*—without taking too much of the time of the committee—I will say that the keel was laid March 11, 1918; she was launched September 30; she had her dock trial December 26; she had her river trial December 29; she was delivered January 4, 1919, and left Hog Island January 6.

On January 23 she sailed for Norfolk, Va., to load coal for Montevideo, Uruguay. She is manned by a Navy overseas crew. She is assigned to the National Shipping Corporation, 25 Broad Street, New York; arrived at Norfolk, Va., January 25; she sailed from Norfolk, Va., January 29. This vessel is just like the *Quistconck*. [See illustration, p. 233.]

HULL 492—"QUISTCONCK"—DELIVERED DECEMBER 3, 1918.

HULL 495—"SACCARAPPA"—DELIVERED DECEMBER 30, 1918.

HULL 493—"SAC CITY"—DELIVERED JANUARY 4, 1919.

Senator KIRBY. What is the average speed of these ships loaded?

Mr. BRUSH. The specifications call for 11½ knots.

Senator KIRBY. Are they making that speed?

Mr. BRUSH. Yes, sir.

Senator KIRBY. I mean do they make it on their regular sea voyages?

Mr. BRUSH. We have no information on which we can base a figure on their actual time, loaded, from port to port. On all of our trial trips we have made better than our specification speed. The last ship made as high as 12.65 knots. That was not loaded, however. We have no definite records yet, except in the case of the *Quistconck* between two ports; she went on to Cuba, and then to Panama, and made approximately 11 knots, which was the engineer's observation, but which would not be satisfactory to us, because he may not have taken into account all corrections but it gave us some conception of what the speed is to be.

The next ship was the *Sacandaga*. And the *Sacandaga* has a good record. This is a picture of the *Sacandaga* [see illustration, p. 235]. It was some satisfaction to me to receive these blotters issued by Wessel, Duval & Co., to pass around [see illustration, p. 236], which advertised the *Sacandaga* to the shipping trade.

The *Sacandaga* has a record as follows: The keel was laid March 20, 1918; she was launched October 29, 1918; she had her dock trial January 7, 1919, and her river trial January 12; she was delivered January 22, and left Hog Island January 25, 1919.

She proceeded to New York to load general merchandise for Chile and the west coast of South America, through the Panama Canal, manned by an American crew. She was assigned to Wessel, Duval & Co., 25 Broad Street, New York. She started loading January 27, with general cargo for Chilean and Peruvian ports, mainly, cargo of cement, naphtha, lubricating oil, locomotives, automobiles, and dry goods. She will sail February 3, and on her return trip I am advised she will carry nitrates.

I have a letter here, which I will not take the time of the Committee to read, from our man on board in which he says the manager of the line has gone over the ship very carefully, and has said he hoped he would get some more just like her. I will not take the time of the committee to read it. It merely confirms the fact this also is a real ship.

The last ship, the *Sagauche*, was accepted last night by the Emergency Fleet Corporation [see illustration, p. 237].

Senator RANSDELL. Is that the fourth or fifth ship?

Mr. BRUSH. That is the fifth ship. We expected to have a dock trial on the sixth ship, the *Sapinero*, to-night [see illustration, page 239], but on account of some work to be done on her engines the dock trial will probably take place Saturday, February 1. The fifth ship, *Sagauche*, was accepted by the Fleet Corporation at 5 o'clock yesterday afternoon, January 29.

Senator RANSDELL. And the sixth ship will be received tonight?

Mr. BRUSH. The sixth ship will probably have a dock trial Saturday, February 1, and we hope under those circumstances to deliver her next Tuesday or Wednesday, February 4 or 5.

Senator JONES. How long has the *Sagauche* been launched?

HULL 494—"SACANDAGA"—DELIVERED JANUARY 22, 1919.

THE WEST COAST LINE.

DIRECT SERVICE
TO
CHILEAN AND PERUVIAN PORTS

THE AMERICAN

100 A1 Steamer

"SACANDAGA"

FOR
PAYTA
SALAVERRY
CALLAO
ARICA
IQUIQUE
ANTOFAGASTA
VALPARAISO
TALCAHUANO

Will commence to receive Jan. 27th
AT PIER 45, FOOT OF CONOVER STREET, BROOKLYN
To Sail - - - Feb. 3rd

FOR FREIGHT AND SHIPPING PERMITS APPLY TO

WESSEL, DUVAL & CO.
25-31 BROAD STREET
NEW YORK
TELEPHONE 6280 BROAD

NEW YORK VALPARAISO SANTIAGO CONCEPCION LIMA

BLOTTER ADVERTISING—SAILING OF "SACANDAGA."

HULL 499—"SAGUACHE"—DELIVERED JANUARY 29, 1919.

Mr. BRUSH. The keel was laid April 8, 1918; she was launched November 22; she had her dock trial January 18, 1919, her river trial January 26; was delivered January 29, 1919, and she is at Hog Island now. I can not give the date she will leave Hog Island, but she is still lying there, entirely out from under our jurisdiction.

We have in the wet basin now 10 ships; we have launched 14 ships; four of them are at sea and in service, and the fifth one was delivered last night; so that we now have in the wet basin 10 ships, or nine besides the one delivered yesterday, January 29, of which you have just seen a picture. I would like to show you these photographs of the ships in the outfitting basin [indicating] very hurriedly. It will show you the stage of completion of the other nine ships there.

That [see illustration, p. 239] is No. 503, *Sapinero.*

The next is No. 507, *Saugerties* [see illustration, p. 240].

This one [see illustration, p. 241] is hull No. 512, *Schodack.*

I will show you the degree of completion in a few minutes.

That [see illustration, p. 242] is No. 501, *Saluda.* We go by hull numbers. I may say that we have no jurisdiction in the selection of those names.

The CHAIRMAN. Those ships are all launched, are they?

Mr. BRUSH. They are all launched and are in the wet basin now being fitted out. The next [see illustration, p. 243] is No. 496, *Saco.*

The next four photographs are No. 497, *Sagaporack* [see illustration, p. 244]; No. 498, *Prusa* [see illustration, p. 245]; No. 500, *Sahale* [see illustration, p. 246]; and No. 506, *Saucon* [see illustration, p. 247], in the order named.

Senator NELSON. Do you put the insides into a ship before launching her?

Mr. BRUSH. You put all the boilers in, Senator Nelson, but not the turbines and gears, because it is not wise to put the turbines or the gears in until the ship is in the water; also the shaft if lined up while the ship is on the ways would get out of line. You ought to do everything you possibly can to your ship on the ways before launching her; and we are proceeding on that policy now. There are 10 of those ships in the wet basin. I believe I have shown them all in those photographs.

The CHAIRMAN. You say there are 10 of those?

Mr. BRUSH. There are 10 of them; one of them is the one transferred last night to the Emergency Fleet Corporation.

Senator RANSDELL. Are there 14 in all that have been launched?

Mr. BRUSH. Yes, Senator; 14 in all. There were 10 in the wet basin and 5 delivered, and it now stands 14 launched, 5 delivered, and 9 in the wet basins being fitted out.

Senator KIRBY. What is the average time of building?

Mr. BRUSH. Later on I will show you a chart that I think will answer that question.

Senator KIRBY. All right.

Mr. BRUSH. So far I have shown you the ships at sea; those in service and those in the wet basin.

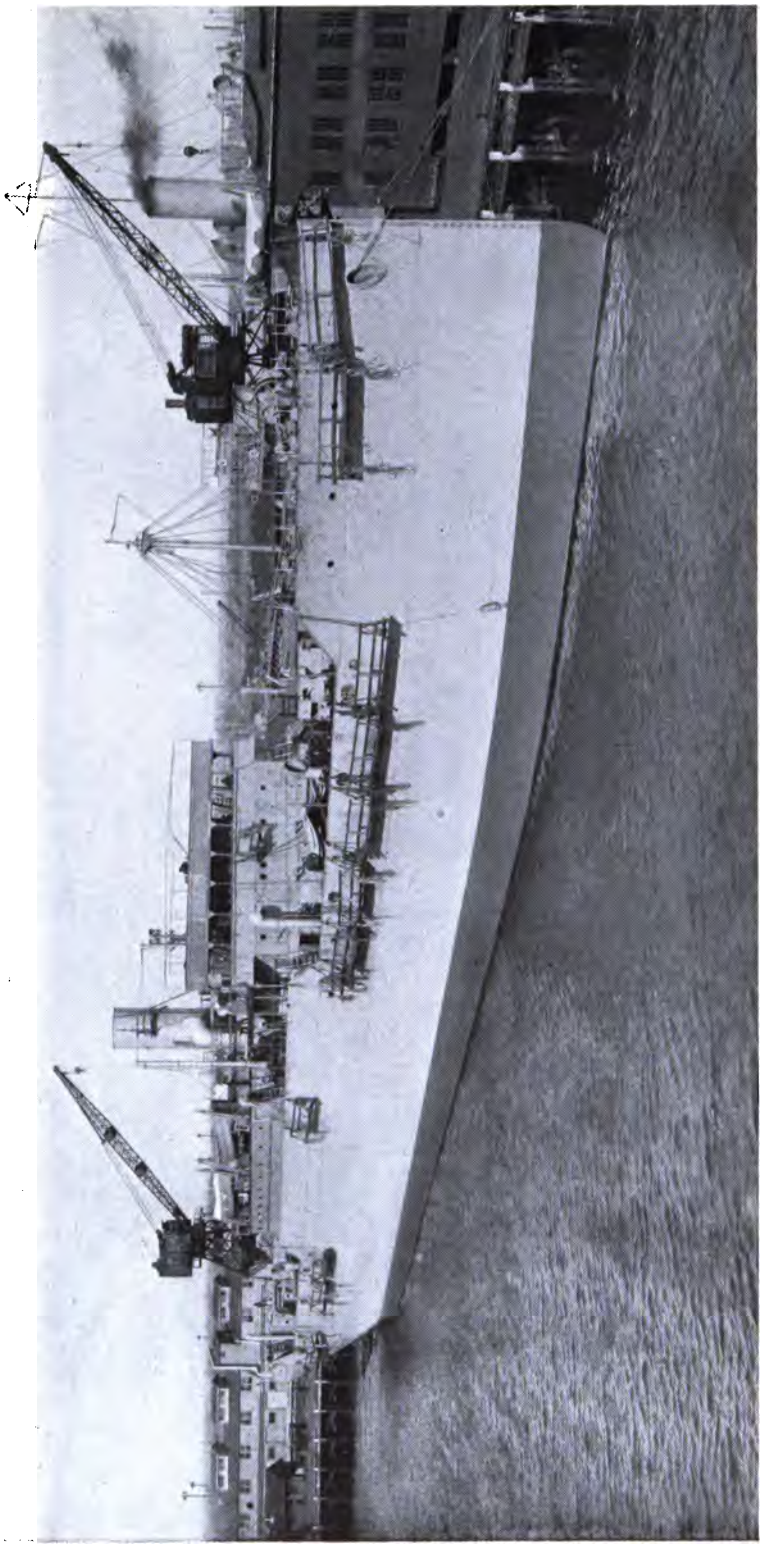
Now, I will show you the 50 ways and the condition of each ship on all these ways. There is a keel on every way at this moment, and this photograph [see illustration on the first insert between pages 248 and 249] is a picture of each of the first 10 ways which we call our first group; that is our first 10 ways. Way No. 1 is the way

HULL 503—"SAPINERO," PIER A-2—LAUNCHED NOVEMBER 22, 1918.

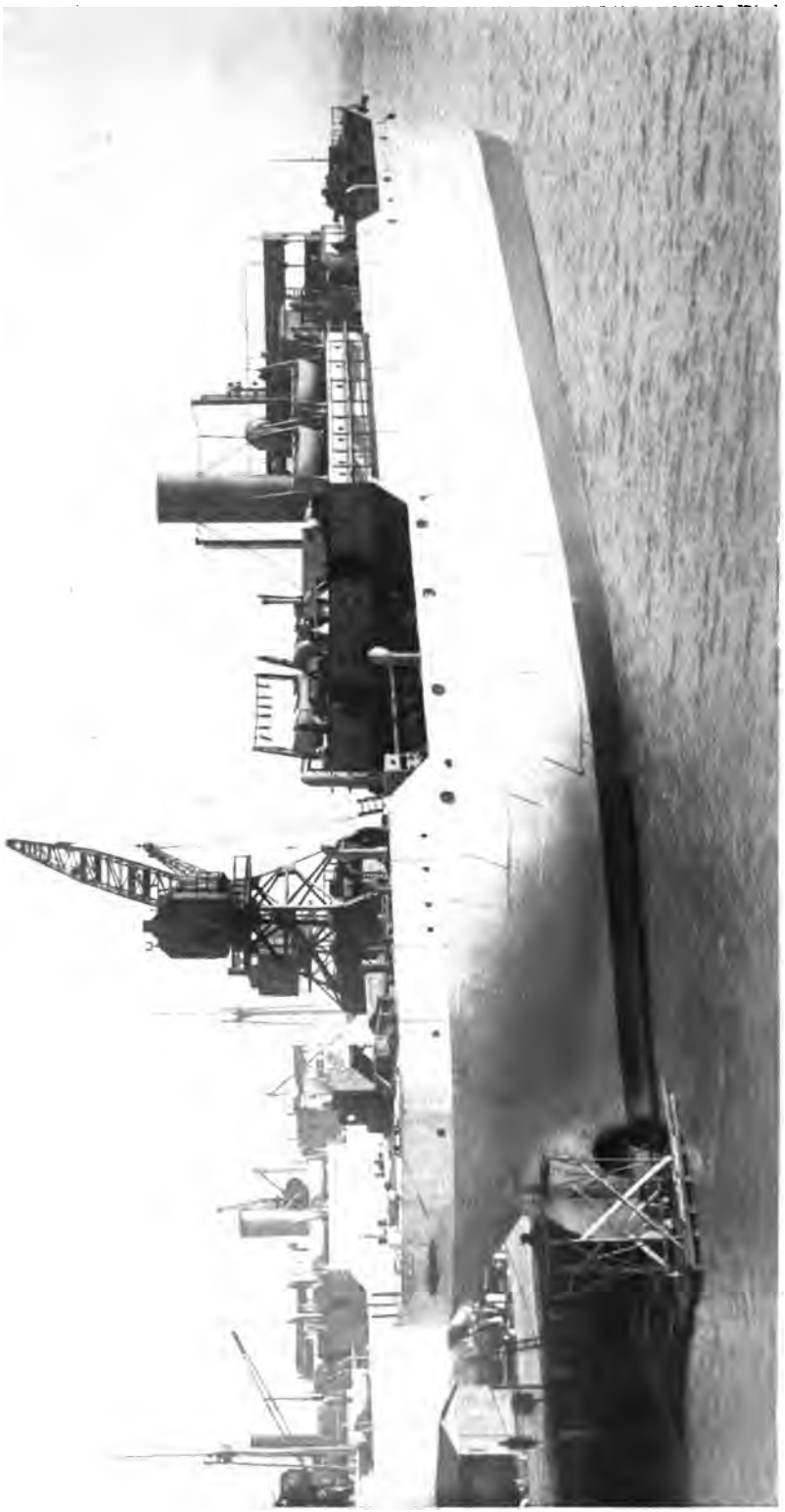
HULL 512—"SCHODACK," PIER A-3—LAUNCHED JANUARY 18, 1919.

HULL 496—"SACO," PIER A-1—LAUNCHED DECEMBER 30, 1918.

HULL 497—"SAGAPONACK," PIER C. 2—LAUNCHED DECEMBER 29, 1918.



HULL 498—"PRUSA," PIER B-2—LAUNCHED DECEMBER 23, 1918.



HULL 500 "SABALO," PIER 8 LAUNCHED DECEMBER 27, 1918.

HULL 506—"SAUCON," PIER C-1—LAUNCHED DECEMBER 31, 1918.

from which we launched the *Quistconck*, and you can see the condition of the second ship on that way; this [indicating] is looking down the ship from the stern; and that [indicating] is looking at the bow from the ground.

This [indicating] is the second way. This [indicating] is the third way, from which a ship has just recently been launched. That [indicating] is the fourth way. The tarpaulins shown in the picture of the fifth way are over her hatches for protection from rain. That answers Senator Nelson's question, because it shows the degree of completion before we launch them.

This [indicating] is the sixth way——

Senator VARDAMAN (interposing). When do you expect to have those ships that are on the ways completed?

Mr. BRUSH. I would rather not make a raw guess. We are doing everything that human energy and ingenuity can do to deliver them promptly, and I believe that they will be delivered promptly. I think we ought not to make promises without sufficient information to know whether we can make good on them.

Senator VARDAMAN. The same purpose did not actuate them when they launched that camouflaged ship before it was finished.

Mr. BRUSH. I think that is true.

The CHAIRMAN. When were those pictures of the ways taken?

Mr. BRUSH. These pictures of the ways were all taken within the last week.

Now, that is our group No. 1 of 10 ways [see illustration on first insert between pages 248 and 249], of which we have five groups. I should appreciate it very much if, throughout the discussion of the Hog Island yard, you would kindly bear in mind that you really have an equivalent of 10 distinct five-way shipyards. I believe that one of the problems with which we have had to contend was the fact that in the analysis of any figures in connection with the yard, it has not been recognized or realized that to fully appreciate what the Government owns there, you should in each case divide whatever figures may be given by 10, which will give you equivalent average figures for a five-way yard, which was approximately the size of most yards previous to the war.

I do not want to take up the time of the committee, but, if you will give me your time, I should like to show you pictures of every one of our 50 ways.

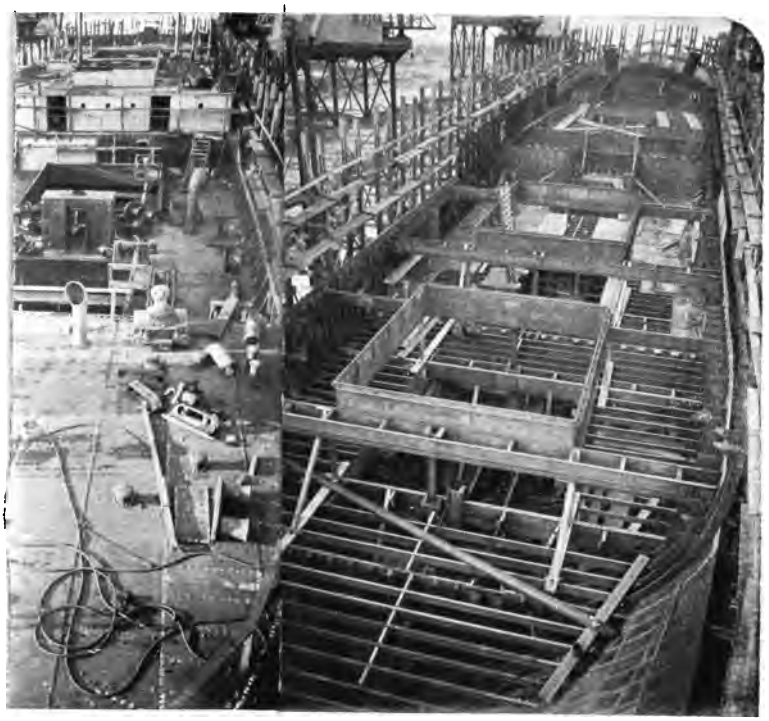
This [see illustration on the second insert between pages 248 and 249] is the second group of ways. In other words, there you see ways Nos. 11, 12, and 13, and so on down to No. 20.

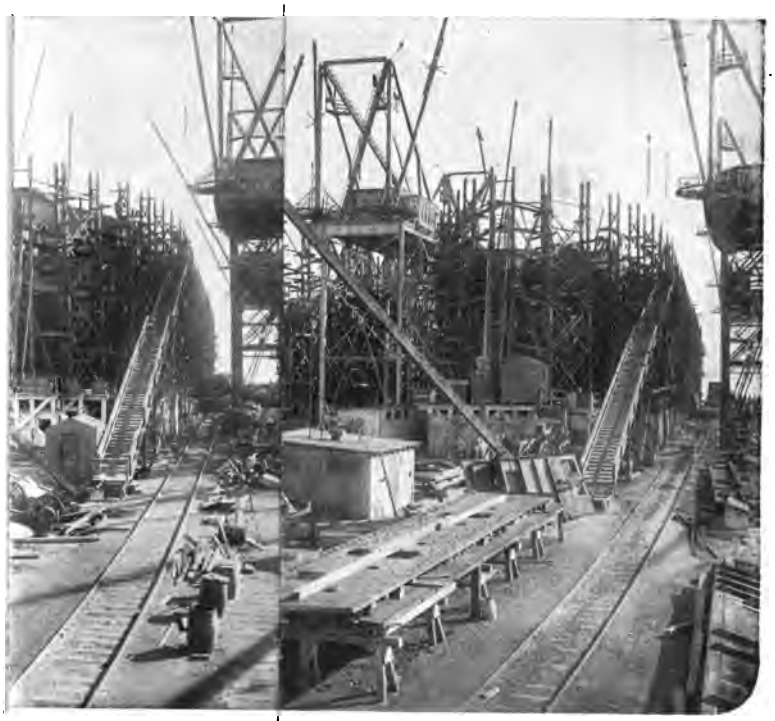
This picture [see illustration on the third insert between pages 248 and 249] shows ways from Nos. 21 to 30.

These two pictures [indicating] show all the ways from 31 to 40 and 41 to 50. [See illustrations on the fourth and fifth inserts between pages 248 and 249.]

In order that you may better understand the photographs of our five groups of 10 ways each, I wish to exhibit to you three photographs taken during the month of July, 1918.

The first one shows the front of the shipways and the space between the shipways and the compressor houses and ways administration buildings. The shipways face Front Street looking north and the compressor houses and ways administration buildings face Front





No. 4.

No. 1.

Street looking south. This photograph was taken from Way No. 1, facing north and east. [See illustration, p. 250.]

The second photograph was taken from the river and shows the river view of the entire 50 shipways looking north and east from the south end of Pier M. [See illustration, p. 251.]

The third photograph was taken from one of the derrick houses on Way No. 1, looking east, and shows the forest of derrick booms, of which there are over 400. [See illustration, p. 252.]

Senator VARDAMAN. This looks down, does it not [see illustration on the fifth insert between pp. 248 and 249].

Mr. BRUSH. Yes; from the stern. From where Senator Nelson sits is looking down into the ship, and the other view is looking from the ground toward the bow. That [indicating] is from the stern looking down. That [indicating] is the bow, looking straight at the ship from in front of the way. There you can see how far that ship is finished; you can see the bow here [indicating photograph of ship on way No. 42; see illustration, on the fifth insert between pages 248 and 249].

Senator RANSDELL. She is pretty nearly finished, is she not?

Mr. BRUSH. Yes; Senator Ransdell. I have shown you these pictures merely to give you an indication of the status of the work, which I myself tried to find out when I first reached Hog Island. The total number of rivets driven is equivalent to 32 ships; that is, if they had concentrated on the building of 32 ships instead of 180 ships and with no idea of going further than 32 ships. The work performed up to last week is equivalent to 32 completed ships.

In order that I may, in my office, follow the progress of the ships—and this will answer your question, I think, Senator Kirby—I have brought with me a copy of this chart [indicating] which can be placed in the record.

This chart [see illustration, p. 253] gives me the date the ship was launched; the date when she had her dock trial; the date when she had her river trial; the date when we delivered her to the Fleet Corporation, and the date when the Fleet Corporation sailed her away from Hog Island.

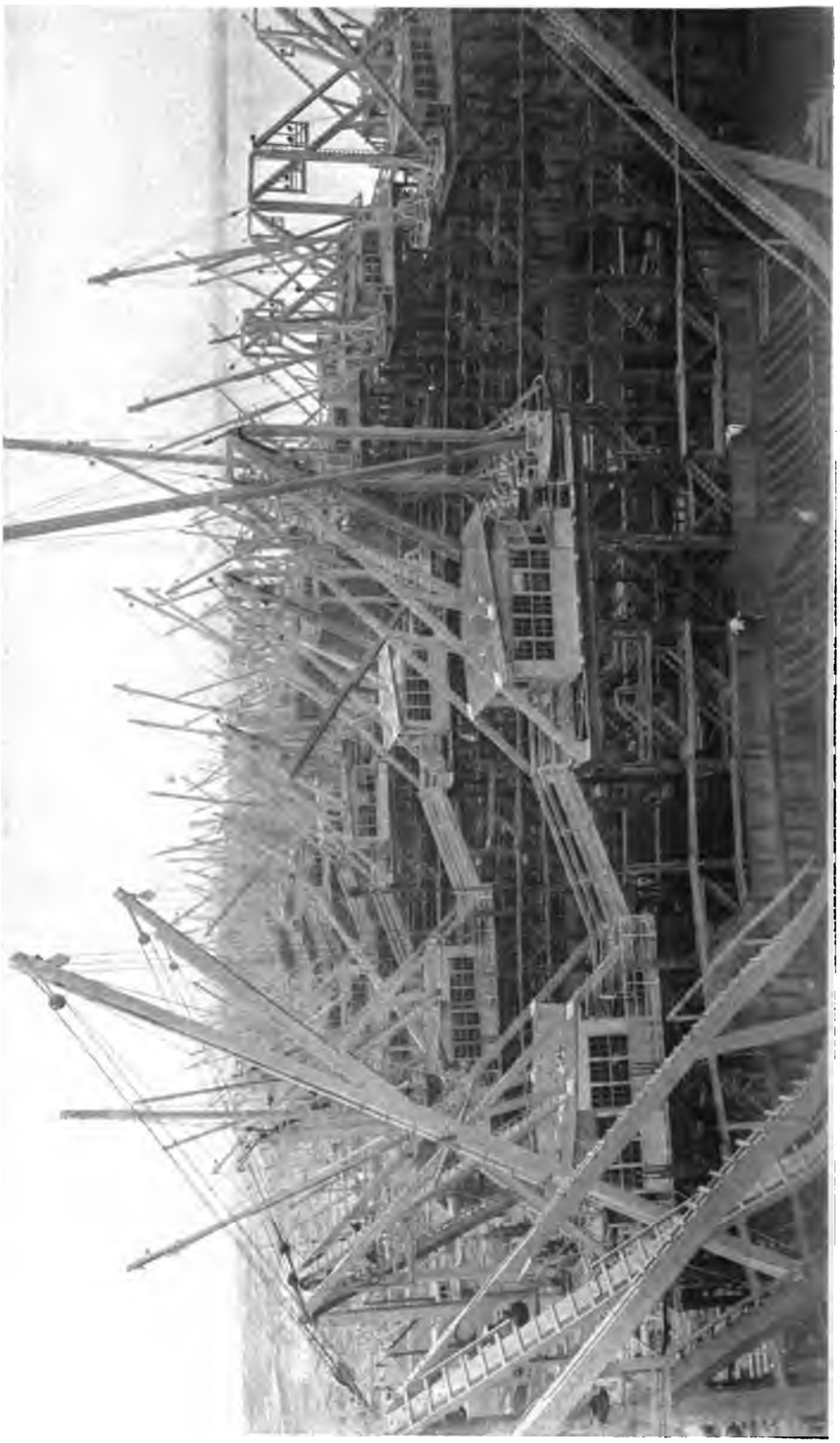
Now, you gentlemen who are familiar with charts of engineers, will recognize the fact that when these lines on this chart [indicating] become more nearly parallel, we are becoming consistent in our work. But here is a case where a ship had her dock trial and her river trial, and then consumed too long a time before she was accepted [indicating]. That was the *Quistconck*.

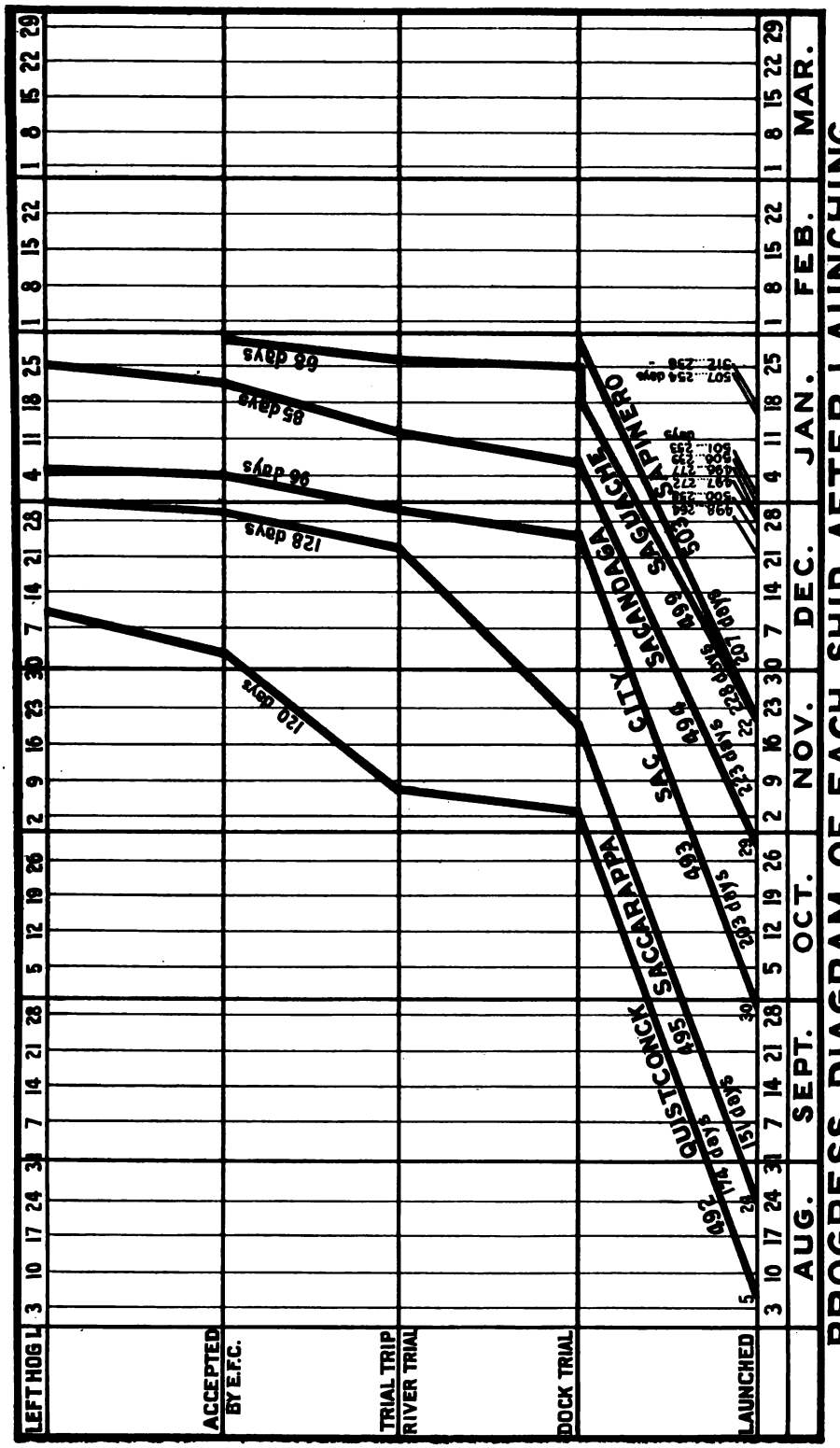
This chart [see illustration, p. 253] shows our last ship, No. 503, *Sapinero*. They hoped to have the dock trial this morning, but they could not make it until Saturday.

Senator LENROOT. Do you think that last ship would be about the average, as to time?

Mr. BRUSH. No; we can do better than that. One of the determining factors of our success at Hog Island is "quantity production." We are taking the matter up with Admiral Bowles now. You gentlemen who have had any experience along this line (and many of you have possibly had much more than I have), have doubtless found that everybody who goes on a ship would like to have it a little different. A captain said to me the other day that everything on his ship was all right, except the captain's cabin, and he wanted that changed.

RIVER-FRONT VIEW OF SHIPWAYS 1 TO 50. JULY 30, 1918.





"CHART W-54"—JANUARY 29, 1919.

Now, they must stop asking us to change all of these ships. If we are going to build ships like automobiles are built, in quantity production, we must build them exactly as the contract and specifications provide. But the tendency of a ship captain, or a ship operator, is to ask for things to be made different, and to give us a list of the changes that they want made.

I know that that time record can be improved. We have not commenced to make the showing that we can make.

I have called attention to these models [indicating models on committee table]. This model [see illustration, p. 255] is the class A ship; and that [see illustration, p. 256] is the class B ship, which I will explain later; this is the ship you have heard talked about. It is a model of the 70 B ships, the contract for which was placed at Hog Island, and which Mr. Piez said to you he believed never should have been placed there. It is really a transport; that is the purpose for which it is being built. There are 11 of these keels now being worked on at Hog Island.

Senator RANSDELL. What is the tonnage of those class B ships?

Mr. BRUSH. Eight thousand tons. Those are 15-knot ships. The class A model, of course, is purely a cargo ship.

Senator RANSDELL. What is the price of the B ships?

Mr. BRUSH. The estimated basic cost is $1,650,000.

Senator KIRBY (interposing). Are they all steel boats—the class B ships?

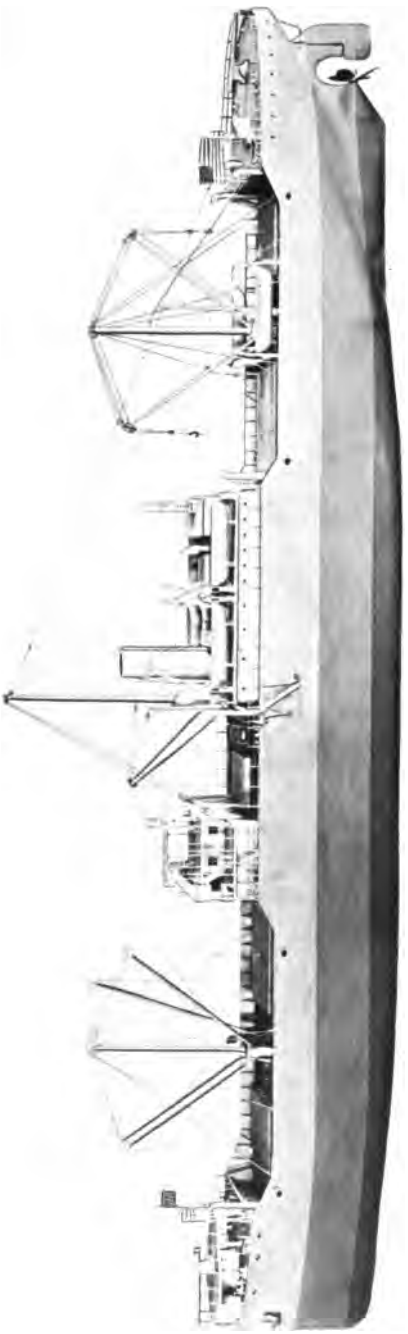
Mr. BRUSH. Yes, Senator; they are steel fabricated ships; the same as the class A ships, except that they are transports.

I think this will be of interest to the committee:

Yesterday there came to Hog Island a committee composed of the following gentlemen: P. A. S. Franklin, president International Mercantile Marine Co.; G. S. Dearborn, president American-Hawaiian Steamship Co.; H. H. Raymond, president Clyde and Mallory Lines; F. D. Strachan, president Southland Steamship Co.; W. F. Gibbs, naval architect; Prof. H. C. Sadler, naval architect for Emergency Fleet Corporation; Admiral F. T. Bowles, assistant general manager Emergency Fleet Corporation; and D. H. Cox, manager Division of Steel Ship Construction, Emergency Fleet Corporation.

They are a committee appointed by the Emergency Fleet Corporation to examine these boats and to consider these and other boats at other shipyards, the plans, etc., to decide to what extent the Fleet Corporation may deem it expedient to make modifications in the design of these boats or what changes they should have in the interior. We do not know, of course, what the committee is going to report, except that it was some satisfaction for me to hear from Mr. Franklin—and I will say perfectly frankly that Mr. Franklin is a director of the American International Corporation that owns our company, so that he may be regarded as a prejudiced witness, but, nevertheless, his opinion was an asset to me, and I have a great deal of confidence in his judgment. However, he is only one member of the committee. He went over the plant yesterday, and I had one of my men telephone and see what he thought of it, and here is what he said:

The Hog Island Shipyard has been fully justified as a war measure. It would have been a great mistake for the E. F. C. not to have provided a shipyard like Hog Island in the serious emergency that existed in shipping.



MODEL OF 7,500 DEADWEIGHT TONS "A" CARGO SHIP.

Our yards had to be expanded overnight and the E. F. C. would have been seriously criticized if they had omitted to provide a yard like Hog Island.

Moreover, Hog Island was of great value in helping to win the war, both in giving moral assistance to our allies and in alarming our enemies.

I went over one of the steamships yesterday lying in the wet basin and found it a very useful steamship, and the Hog Island ships should prove useful to the commerce of this country.

Senator VARDAMAN. What relation has Mr. Franklin to the Emergency Fleet Corporation?

Mr. BRUSH. I understand that Mr. Piez, in his anxiety to act wisely in respect to peace cancellations, as explained to your committee in the last hearing, has appointed a committee, of which Mr. Franklin is chairman, to go over the ship construction program of the Emergency Fleet Corporation at all the yards and then make recommendations in order that Mr. Piez may take it up with the other officers of the Fleet Corporation and the Shipping Board and act intelligently with respect to it.

Senator VARDAMAN. Mr. Franklin is also a stockholder in your company, is he?

Mr. BRUSH. He is a director in our company. I am not reading this, except——

Senator KIRBY (interposing). You have not completed the sixth ship yet?

Mr. BRUSH. No, sir. It is in the outfitting basin about ready for its dock trial.

Senator KIRBY. You said something about changing it from this model, or, rather, from a transport ship. [See illustration, p. 256.]

Mr. BRUSH. No; I did not mean to. I said the A ship is a cargo ship [indicating model; see illustration, p. 255].

Senator KIRBY. I understand the difference. I thought that was a combination ship.

Mr. BRUSH. Our B ship is a combination troop transport and cargo ship.

Senator LENROOT. Is that adapted to general passenger and freight traffic?

Mr. BRUSH. From what they say to me—and I must be governed very largely by what I have been able to learn—Admiral Bowles feels very strongly indeed that that ship is absolutely right and should be built. Other members of the Fleet Corporation do not entirely concur with him, and some outsiders agree with Admiral Bowles and some do not. I think that the committee, which consists of the presidents and officers of several large operating companies and several naval architects, is going to make recommendations to Mr. Piez which will govern any modifications that the Fleet Corporation make in it.

The CHAIRMAN. Which ship is that you are speaking of?

Mr. BRUSH. The B ship.

Senator KIRBY. What is the matter with it that it ought to be modified?

Mr. BRUSH. It is a combination troop and cargo ship and was not built to carry freight and passengers. It is a 15-knot ship, of 8,000 tons, and the comment from such men as Capt. Dollar, who went over the plans with me, and who went over the plans of the *Quistconck* with me, was that a 15-knot ship should be of a greater tonnage than 8,000 and a 15-knot ship should be a combination passenger and freight ship, and not a combination troop and cargo ship.

That ship was designed and planned purely for war purposes.

Senator KIRBY. How many are to be built of those—70?

Mr. BRUSH. There are 70 B ships to be built under our contract; and there are 11 keels laid; practically 75 per cent of the steel is on the island for 35 of them; in other words, about 75 per cent of the material either is in transit from the fabricators to Hog Island or is on hand at our plant for the first 35 B ships. I will give you the figures——

Senator KIRBY (interposing). What would be the life of a ship like that?

Mr. BRUSH. I can not answer that, except to say that I do not know why it should not be as long as the life of any steel ship. All of these are turbine ships.

Senator KIRBY. What I am getting at is, if we are going to keep an Army, we should have transports for it.

Mr. BRUSH. Well, my opinion is not worth much; but if I were President of the United States, I should build transports—but that is my personal opinion, of course.

Senator KIRBY. I was just wondering what the life of those ships would be.

Mr. BRUSH. I think it would be the same as any steel ship.

Senator LENROOT. Do I understand correctly that 20 of those class B ships can be canceled without any loss?

Mr. BRUSH. Not without any loss; but 20 of them could be canceled or changed without any very substantial loss. But if you go back of the 20 I think there would be a tremendous loss.

Senator NELSON. Have those vessels one propeller or two?

Mr. BRUSH. They have only one propeller, Senator Nelson, but they have a high and low pressure turbine, connected through gears to the shaft, and then to the propeller, like the old Corliss cross compound reciprocating engine which had a high and low pressure cylinder, the high-pressure cylinder exhausting into the low-pressure cylinder. In these turbines, the steam goes through from one turbine to another. The turbine makes 3,600 revolutions per minute, and is reduced through several gears to the shaft which turns between 95 and 100 revolutions per minute, which is the number of revolutions of the propeller.

I might say at this point that I am a steam engineer, and an engineer by profession. I am a trained engineer and a trained mechanic; that is my business.

When you get into an engine room in a ship it is no different from an engine room in a power station—and I have been dealing with such for years. I have been dealing with turbines since 1904. At that time I had charge of the installation of a 500-kilowatt turbine, and last year I had charge of the installation of a 35,000-kilowatt turbine, which is as large as they make them.

Now, the gears in that ship [indicating] commencing with the *Quistconck*, up to the ship that was delivered last night, have not given us a particle of trouble in any way, shape, or manner [knocking on table].

Senator NELSON. Where are these gears manufactured?

Mr. BRUSH. At the General Electric works. They are furnished to us by the Emergency Fleet Corporation; we do not buy them.

The gears reduce the revolutions from 3,600 per minute to approximately 100 per minute at the propeller, and those turbines have not given us one particle of trouble since they were installed.

We examine them like they examine the works of a watch. We turn them by hand several revolutions. We pump oil through them for 24 hours and then we take off the cases and we wipe every square inch of them, examining them very minutely, and then we turn them several revolutions more. We have not had one particle of trouble with our gears since they have been installed. We have not had a shaft that was not in perfect alignment.

And as an engineer, I think it is a remarkable thing to take a crowd of men who have not been together as an organization working for years, and have them take a set of blue prints and put together a ship, just like they were building a steel building.

Hog Island, Senators, is an "assembling shipbuilding plant," not an old-line shipbuilding plant.

We assemble the ship with pieces of material fabricated, from blue prints, in 88 fabricating plants and approximately 4,000 manufacturing plants produce the machinery and outfitting scattered throughout the United States.

We bring the material for the ships to Hog Island and it is riveted by many riveters who have never seen a rivet before. We put more than 11,000 men through our school who have since become practical shipbuilders.

The launching of every one of the 14 ships has been perfect. The ships have gone to the wet basin, and they have there installed the turbines, and the gears, and the shafts, etc.

As a matter of interest to the committee, I wish to place in the record a photograph of the launching of the *Schodack* from way No. 12 on January 18, 1919. This is a very interesting photograph taken from the head of the shipway as the ship was taking the water [see illustration, p. 260].

I stood beside the shaft of the *Quistconck* when she made her first revolution and saw the engineer open the throttle—and there never has been one particle of trouble, or one single change in that turbine, or gears, or other mechanism since that time. I know what I am talking about, because the men who can set up a ship from blue prints and have her run and go right out to sea, and have her do well on her voyage have done a good job. They are as fine and as capable a team of outfitting men as you will find in the United States; they are first-class outfitting engineers.

Would you like to have me give the yard layout?

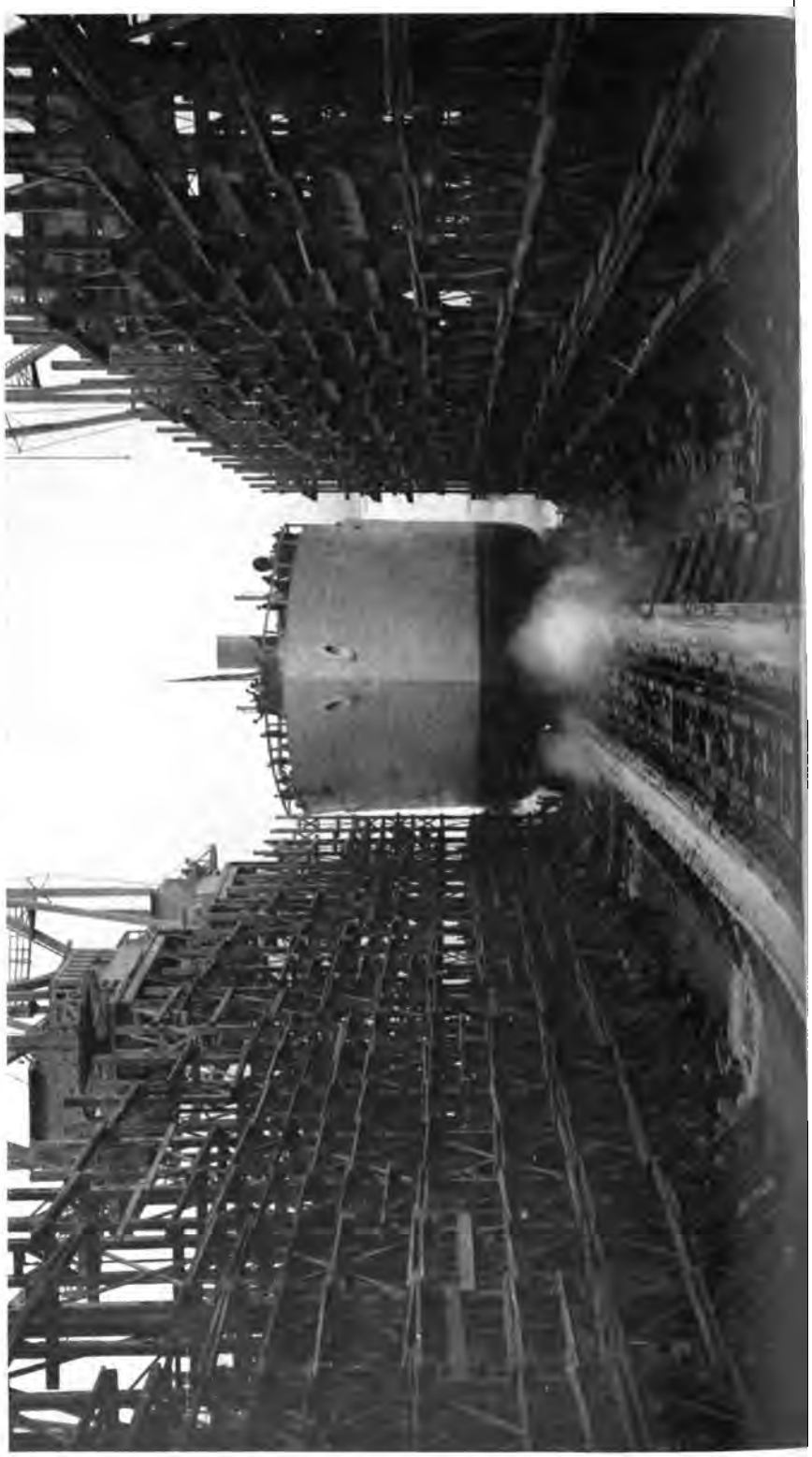
Senator JONES. I wanted first to ask you as to whether there is any serious difference of opinion as to the suitability of that ship—the class B boat—as a transport?

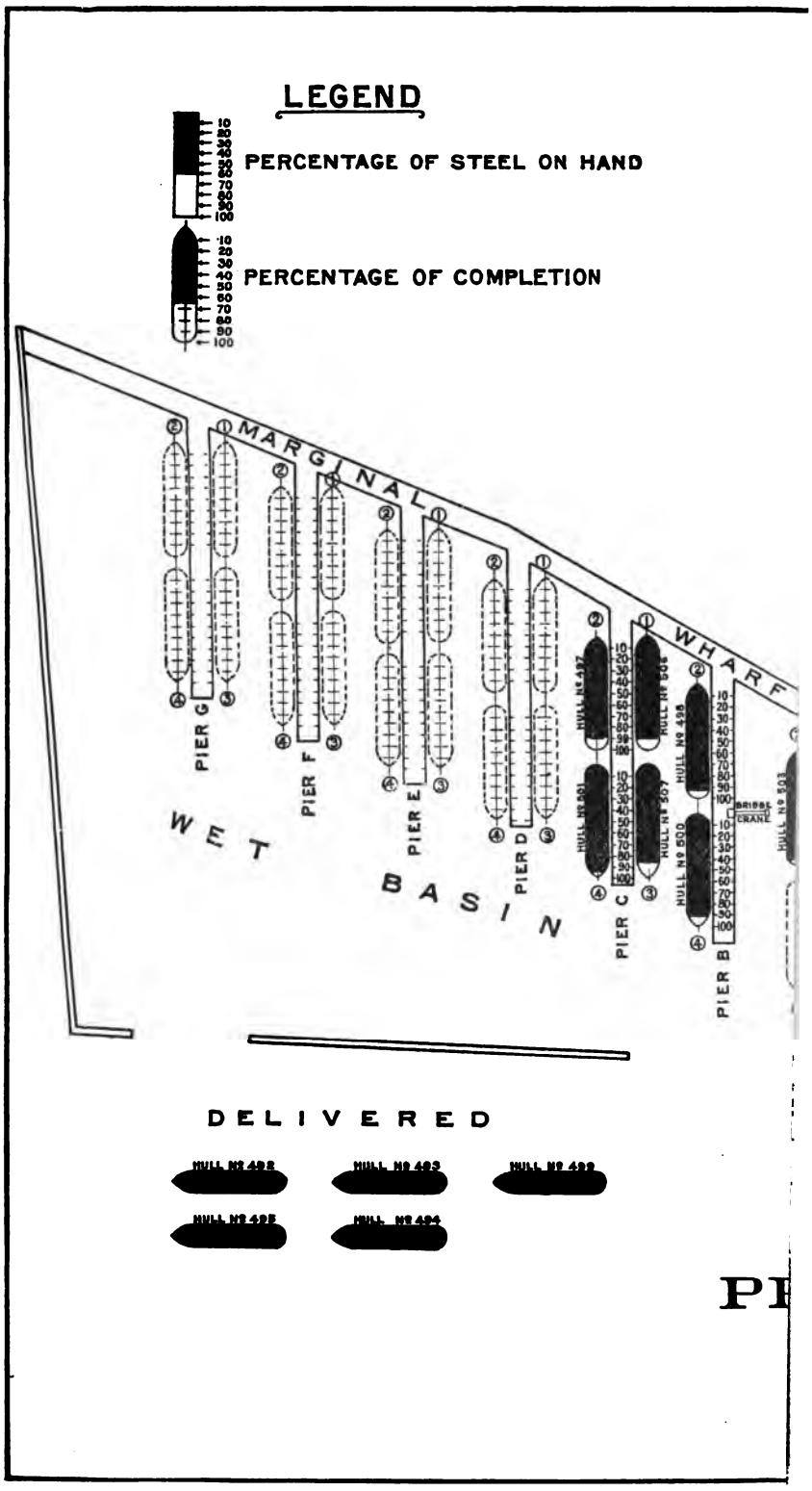
Mr. BRUSH. I do not think so as a transport.

Senator JONES. So that the difference of opinion arises as to what should be done if the ship is changed over to a cargo or passenger ship; does it?

The CHAIRMAN. Yes; it is a question of the use of the ship.

Mr. BRUSH. It is a question as to the use of it. If the war had lasted until next November 11, there would have been no question. I do not think personally that there is any question but what she is a good transport; but it is a question of the adaptability of that design to peace conditions and that is what they are to-day studying





97215°—19. (To face page 261.)

Senator LENROOT. Can you tell us the carrying capacity of the B boat as a transport?

The CHAIRMAN. How many men would it carry?

Mr. BRUSH. She is designed to carry 2,200 to 2,300 troops and 77 officers, in addition to the regular crew of about 81 men.

Senator JONES. Can you also give us any idea now as to what the cost would be to change that ship from a transport to a suitable passenger ship?

Mr. BRUSH. I could not now, Senator Jones, but I think it is a perfectly proper question, and I have been asked that question by Mr. Piez and Admiral Bowles—not for me to answer it—but for me to sit down with these people and see if we can figure out an answer to that question. I understood that Mr. Piez was to furnish you that information, but we will be glad to be a party to it.

This chart showing progress of ship construction [see illustration on insert between pages 260 and 261] simply indicates our status last week. This ship [indicating] was delivered last night. That leaves us nine undelivered ships in the wet basin. There[indicating] are the ships on the 50 ways; and this chart indicates their degree of completion. I keep this report in my office. This rectangle [indicating] in front of the ship indicates to me whether or not the material for that ship is on the ground, and to the extent that the rectangle is filled in, it is there; and to the extent that the rectangle is not filled in, it is not on the ground.

You will notice that we have laid the keels for three of these second 60 A ships. You understand, we have a contract for 50 A ships; then for 70 B ships; then for 60 additional A ships.

All of the material is on hand for that group of 50 A's [indicating]. There are five B ships in group No. 3; there are three other B ships in group No. 4, and three B ships in group No. 5 [indicating], which gives a total of 11 B ship keels on all the ways.

I do not know whether that is clear to you. Senator Vardaman you asked with regard to the names. You will notice that I give the numbers.

Senator VARDAMAN. That is of no importance; there is nothing in names, anyhow.

Mr. BRUSH. Here [see illustration on insert between pages 260 and 261] is the name of every one of the 180 ships.

Senator LENROOT. Have you a diagram showing the material in process of manufacture?

Mr. BRUSH. Not in diagram, Senator Lenroot, but the figures are shown on another exhibit that I propose to introduce a little later.

The CHAIRMAN. I suppose we could insert this chart in the hearings, if desirable. [See illustration on insert between pages 260 and 261.]

Mr. BRUSH. I now wish to direct your attention to another chart, which shows the situation with regard to the first 50 A ships. It gives the hull number, the name, the number of the way, the yard, the date when the keel was laid; it shows the date that the ship was launched, the berth number, and the pier in the wet basin, and the number of days it was on the ways—you asked me that question, Senator Lenroot, and I think this will answer it. [See illustration, page 262.]

RECORD OF KEELS LAID AND SHIPS LAUNCHED-FIRST "50 A" SHIPS

LL NO.	NAME	KEEL LAID			LAUNCHED		DAYS ON WAYS	DOCK TRIAL	RIVER TRIAL	DAYS IN W.B.	DELIVERED		LEFT ISLAND
		WAY	YARD	DATE	BERTH	DATE					DATE	TO	
492	QUISTCONCK	1	1	2-12-18	B-2	8- 5-18	174	11- 3-18	11- 7-18	120	12- 5-18	USSB	12-10-18
495	SACCARAPPA	21	5	3-26-18	B-4	8-24-18	151	11-20-18	12-22-18	128	12-30-18	USSB-USN	12-31-18
493	SAC CITY	6	2	3-11-18	C-1	9-30-18	205	12-26-18	12-29-18	96	1- 4-19	USSB-USN	1- 6-19
494	SACANDAGA	2	1	3-20-18	C-3	10-29-18	223	1- 7-19	1-12-19	85	1-22-19	USSB	1-25-19
496	SACO	3	1	3-28-18	A-1	12-30-18	277						
497	SAGAPORACK	22	5	4- 1-18	C-2	12-29-18	272						
498	PRUSA	7	2	4- 3-18	B-2	12-23-18	264	1-13-19					
499	SAGUACHE	20	4	4- 8-18	A-4	11-22-18	228	1-25-19	1-26-19	68	1-29-19	USSB	
500	SAHALE	40	8	4-15-18	B-4	12-27-18	256						
501	SALUDA	41	9	4-22-18	C-4	12-31-18	253						
502	SANGAMON	4	1	4-25-18									
503	SAPINERO	11	3	4-29-18	A-2	11-22-18	207						
504	SARCOXIE	8	2	5- 2-18									
505	SATARTIA	23	5	5- 4-18									
506	SAUCON	30	6	5- 6-18	C-1	12-31-18	239						
507	SAUGERTIES	19	4	5- 9-18	C-3	1-18-19	254						
508	SAUGUS	31	7	5-13-18									
509	SCANTIC	39	8	5-16-18									
510	SCATACOOK	50	10	5-20-18									
511	SCHENECTADY	42	9	5-23-18									
512	SCHODACK	12	3	5-27-18	A-3	1-18-19	236						
513	SCHOHARIE	5	1	5-29-18									
514	SCHOODIC	29	6	6- 3-18									
515	SCHROON	32	7	6- 6-18									
516	SCITICO	9	2	6-10-18									
517	SCOOBA	24	5	6-12-18									
518	SEBANOOK	49	10	6-13-18									
519	SEBETHE	18	4	6-17-18									
520	SEBEWA	38	8	6-20-18									
521	SEBEWAING	45	9	6-24-18									
522	SEEKONK	13	3	6-27-18									
523	SENATOBIA	28	6	7- 1-18									
524	SHAKOPEE	33	7	7- 3-18									
525	SHAMONG	48	10	7- 8-18									
526	SHANDAKEN	10	2	7-11-18									
527	SHANNOCK	25	5	7-15-18									
528	SHAUME	17	4	7-18-18									
529	SHAVANO	1	1	8- 5-18									
530	SHAWAN	14	3	8-19-19									
531	SHAWANGUNK	15	3	8-22-18									
532	SHAWAND	16	4	8-26-18									
533	SHEBOYGAN	44	9	9- 9-18									
534	SHEPAUG	47	10	9-11-18									
535	SHESHEQUIN	6	2	10-21-18									
536	SHETUCKET	34	7	10-22-18									
537	SHICKSHINNY	37	8	10-24-18									
538	SHINNECOCK	2	1	11- 4-18									
539	ZETELLA	11	3	11-30-18									
540	SHIVWITS	20	4	12- 3-18									
541	SHOCCOREE	7	2	12-27-18									

LOG OF BOATS IN SERVICE

QUISTCONCK - LEFT HOG ISLAND DECEMBER 10,1918. PROCEEDED TO NORFOLK VA. LEFT NORFOLK VA. ON JANUARY 2,1919 LOADED WITH FULL CARGO OF COAL. DELIVERED AT CRISTOBAL JANUARY 10. ARRIVED NEW ORLEANS JANUARY 23RD. MANNED BY EMERGENCY FLEET CORPORATION CREW. ALL AMERICAN CREW.

SACCARAPPA - LEFT HOG ISLAND DECEMBER 31,1918. PROCEEDED TO PHILA. LEFT PHILA. JANUARY 18 FOR NEW YORK. ARRIVED NEW YORK JANUARY 20 TO LOAD GENERAL MERCHANDISE MANUFACTURED IN THIS COUNTRY FOR RIO DE JANEIRO, BRAZIL. MANNED BY AN AMERICAN CREW.

SAC CITY - LEFT HOG ISLAND JANUARY 6. PROCEEDED TO PHILA. LEFT PHILA. JANUARY 23RD FOR NORFOLK VA. ARRIVED NORFOLK VA. JANUARY 25. LEFT NORFOLK JANUARY 29 FOR MONTEVIDEO. MANNED BY NAVAL OVERSEAS CREW.

SACANDAGA - LEFT HOG ISLAND JANUARY 25 FOR NEW YORK. ARRIVED NEW YORK JANUARY 26TH TO LOAD GENERAL MERCHANDISE FOR CHILE-WEST COAST OF SOUTH AMERICA - THROUGH PANAMA CANAL. AMERICAN MANNED AND AMERICAN GOODS.

JAN. 30, 1919

RECORD OF KEELS LAID AND SHIPS LAUNCHED—FIRST 50 "A" SHIPS " F-2," JANUARY 28, 1919.

Mr. BRUSH. It shows the date of dock trial and of the river trial, and the days in the wet basin, as well as the date delivered and the date it left Hog Island. If we can keep on improving the time in our wet basin we will very much shorten the time of delivery. You see, we started out with 120 days, and now we have it down to 68. The reason for that is that we are now doing the work on the ways where we ought to do it, instead of doing it in the wet basin.

Senator LENROOT. I notice that on hull No. 502 the keel was laid April 25, 1918, and on hull 512 the keel was laid a month later, but that ship has been launched.

Mr. BRUSH. Yes, sir.

Senator LENROOT. What is the reason for the delay on No. 502?

Mr. BRUSH. That arose in connection with the distribution of material. Originally, when the material came in, everybody was talking "tonnage." Now, tonnage is not worth a nickel to us; it is pieces that we need, because you could have 99½ per cent of your tonnage in the yard and be shy one single piece that you needed at the time, and you could not go on with your ship. Now, they put the pieces of material on the ships that are most convenient to work on without respect to the date that keels were laid.

When the lines on chart No. W–54, which I exhibited to you a few minutes ago, are parallel, we will be consistent in our work. [See illustration, p. 253.]

This chart [see F–3, printed below] shows the degree of completion of every ship on the island. It includes the 50 on the ways, the 14 that have been launched, including the 5 that have been delivered. We have laid the keels of 11 of the class B ships, and the keels of 3 of the second 60 A's. I will hand this chart to the stenographer, and he can place it in the record.

(The chart F–3 referred to is here printed in full as follows:)

"F-3" [Jan. 29, 1919].

Hull No.	Name.	Location.	Per cent complete.	Remarks.
A—492	Quistconck		100.0	Delivered.
495	Saccarappa		100.0	Do.
493	Sac City		100.0	Do.
494	Sacandaga		100.0	Do.
499	Saguache	A–4	100.0	Do.
503	Sapinero	A–2	99.0	Will be delivered within a week.
498	Prusa	B–2	85.0	
500	Sahale	B–4	86.0	
497	Sagaporack	C–2	93.0	
496	Saco	A–1	85.0	
506	Saucon	C–1	85.0	
501	Saluda	C–4	88.0	
507	Saugerties	C–3	84.0	
512	Schodack	A–3	83.0	
502	Sangamon	4	76.5	
504	Sarcoxie	8	73.0	
505	Satartia	23	74.0	
508	Saugus	31	84.0	
509	Scantic	39	76.5	
510	Scatacook	50	69.0	
511	Schenectady	42	80.0	
513	Schoharie	5	74.8	
514	Schoodic	29	69.2	
515	Schroon	32	78.0	
516	Scitico	9	59.0	
517	Scooba	24	29.0	
518	Sebamook	49	55.5	
519	Sebethe	18	53.5	
520	Sebewa	38	50.0	
521	Sebewaing	43	56.0	
522	Seekonk	13	58.0	
523	Senatobia	28	50.0	
524	Shakopee	33	52.0	
525	Shamong	48	39.0	
526	Shandaken	10	40.0	
527	Shannock	25	33.0	

Hull No.	Name.	Location.	Per cent complete.	Remarks.
A—528	Shaume	17	47.0	
529	Shavano	1	46.0	
530	Shawan	14	38.0	
531	Shawangunk	15	33.0	
532	Shawano	16	34.0	
533	Sheboygan	44	39.0	
534	Shepaug	47	31.0	
535	Sheshequin	6	31.0	
536	Shetucket	34	28.0	
537	Shickshinny	37	26.0	
538	Shinnecock	2	24.0	
539	Zetella	11	13.0	
540	Shivwits	20	11.0	
541	Shoccoree	7	19.0	Fiftieth A vessel. Average of 50 is 60.8 per cent completed.
B—669	Shohokin	35	9.0	First B vessel.
670	Shohola	45	15.0	
671	Shope	36	16.0	
672	Sinnemahoning	26	14.0	
673	Sinsinawa	46	14.0	
674	Siskowit	21	14.0	
675	Sisladobsis	27	14.0	
676	Sisseton	40	10.6	
677	Sitkum	41	9.0	
678	Skamania	22	3.5	
679	Skanawono	30	1.1	Average of 11 B's is 12 per cent completed.
A—1482	Red Jacket	3	1.0	First of second 60 A vessels.
1483	Cimarron	12	1.0	
1484	Cinnabar	19	1.0	

Total, 64 vessels. Total equivalent of 32 complete A vessels.

Mr. BRUSH. Do I make myself clear in regard to these contracts? We have a contract for 50 of the so-called A ships; then we have a contract for 60 more A ships exactly the same; then we have a contract for 70 of the troop ships, or class B ships. We call them the first A's, the second A's, and the B's.

Senator NELSON. When do you expect to go on and complete these ships?

Mr. BRUSH. I am going to keep on hurrying until somebody stops me—and if they are going to stop us they will have to hurry in order to do it.

Senator NELSON. I am so old that I will not see the last of them. [Laughter.]

Mr. BRUSH. Oh, yes, you will, Senator Nelson; we are going to have you come up and christen the last one of them.

Senator JONES. It might be interesting to know whether or not you have really figured out, if you are allowed to go on and your organization is to continue in operation, when you are going to launch the last ship.

Mr. BRUSH. I have not, but I will. I went in there on December 13, 1918. The first thing I tried to do was to try to get acquainted with my men, and to get the men acquainted with me.

Senator JONES. I think you were wise in that.

Mr. BRUSH. And I am the kind of a fellow who likes to tell you the kind of a whale of a job I have done, instead of telling you what I am going to do.

Senator JONES. That is the kind of men that accomplish things.

Mr. BRUSH. Now, I have tried to find out how we compare with other shipyards with regard to driving rivets, and the last figures I have are of the week of November 30, 1918; we have made a comparison of the rivets driven in the various plants in our district.

The CHAIRMAN. That will be inserted in the record at this point.

(The statement referred to is here printed in full as follows:)

"F-4."

Riveting, week ending Nov. 30, 1918.

Plant.	Rivets per gang day.	Cost per rivet.	Plant.	Rivets per gang day.	Cost per rivet.
Harlan plant	292	$0.079	Chester shipyard	243	$.097
Cramps shipyard	131	.142	Merchants' shipyard	166	.126
P. & J., Gloucester	239	.089	Hog Island shipyard	242	.093
P. & J., Wilmington	167	.148			
New York shipyard	306	.090	Average	222	.102
Sun shipyard	154	.156			

Mr. BRUSH. The next statement shows the progress that has been made from August 1 to December 1 in the number of rivets driven per gang per day and the cost per rivet. [See chart F-5 printed below.]

Senator JONES. And is the gang the same number of men in each of these yards?

Mr. BRUSH. Yes, sir. You see every one of these yards is under the Macy Board, absolutely, so that those comparisons mean something, and here is a photograph of a typical riveting gang. [See illustration, p. 266.] The man with the rivet gun in his hand is the riveter. The man standing below, holding the rivet in place, is the holder-on, and the boy at the rivet furnace is the heater boy.

Senator NELSON. Your gangs are composed of three men, are they?

Mr. BRUSH. Yes, sir; three and four men. The last column in this table shows the cost per rivet. There were two shipyards ahead of us in the number of rivets driven per gang. Of course I have my own figures on that since then, but I can not give you any later figures for the other yards now. But I was anxious to see whether we were improving or not, and I found that our number of rivets per gang per day had increased from 104 in August to 242 on December 1, and our cost per rivet had decreased from 21.1 cents on August 1 to 9.3 cents on December 1.

Senator JONES. You said there were only two yards ahead of you; it shows three on this sheet. [Indicating.]

Mr. BRUSH. Yes; there were three ahead of us. My error, Senator Jones.

The CHAIRMAN. The statement which you have there showing the progress in the riveting at Hog Island will be inserted in the record at this point.

(The statement referred to is here printed in full, as follows:)

"F-5."

Progress in riveting, Hog Island.

Date.	Rivets per day.	Rivets per gang day.	Cost per rivet.
Aug. 1	30,000	104	0.211
Sept. 1	56,000	120	.141
Oct. 1	100,000	152	.138
Nov. 1	130,000	200	.104
Dec. 1	140,000	242	.093

TYPICAL RIVETING GANG.

Senator LENROOT. Are these comparisons of rivets driven for ships of the same character?

Mr. BRUSH. There are no other ships of exactly the same character.

Senator LENROOT. But they are cargo ships, are they?

Mr. BRUSH. These are cargo ships; and, of course, that comparison does not mean a great deal, except that it helps us to encourage our men to feel that we have a bogey to work to and that is the reason we have accomplished what we have accomplished.

Senator RANSDELL. Will you tell us which of these plants on this statement are Government plants?

Mr. BRUSH. That [indicating] is the Government fabricating plant, at Bristol, Pa.

Senator VARDAMAN. The plant of the Merchants Shipbuilding Corporation?

Mr. BRUSH. Yes, Senator Vardaman.

The CHAIRMAN. When you speak of the different plants please name them so that the record will show to which you refer.

Mr. BRUSH. Now, the Chester plant is doing Government work. There are no other plants similar to ours in that table. In other words, the Harlan & Hollingsworth plant, the Cramps, the Gloucester, the Wilmington, and the Sun are all doing a tremendous amount of Government work, but they are not so-called Government plants.

Senator RANSDELL. How long have they been in operation, relatively? What I mean is, I want to see if those other yards are old-established plants as compared to Hog Island, about which, of course, we know.

Mr. BRUSH. Cramps is older than I am. And all these plants shown on the table are old plants except the Sun—which may not be as old, and the Merchants—at Bristol.

Senator RANSDELL. The New York shipyard is an old one, is it not?

Mr. BRUSH. Yes, sir.

Senator RANSDELL. They are all old except the Merchants, the Sun, and Hog Island?

Mr. BRUSH. Yes, sir; as far as I know. But if our work is laid out as it should be, and our material comes along on schedule, and we do not beat these other yards in rivet driving, there is no excuse for us, provided our material comes to us, as it should, in sequence, because that is the secret of success in building fabricated ships the way we are building them.

Senator NELSON. Let me suggest to you that in Cramps' yard they are building a lot of naval vessels.

Mr. BRUSH. Yes, sir.

Senator NELSON. And I take it that the riveting on those is a more difficult job.

Mr. BRUSH. Yes, sir.

Senator NELSON. More difficult than it is on merchant vessels.

Mr. BRUSH. There is no question about that, provided they are battleships and that is the reason I said what I did about using these comparisons to encourage our men.

Senator NELSON. And therefore these figures as to Cramps' yard, if they are included, are not exactly a fair comparison.

Mr. BRUSH. Perhaps not for your purposes, Senator Nelson, but it is a bully comparison for me to sit around a table with my boys and see if we can not get somewhere.

Senator NELSON. Yes; I understand.

Mr. BRUSH. May I say that my assistant says that in the cost per rivet driven in that riveting table there are no naval vessels included; they are all merchant ships, so that we are better off than we thought. [See chart F–4, p. 265.]

Senator VARDAMAN. May I ask you if there is any difference in the difficulty of riveting in those other yards from that in your own yard?

Mr. BRUSH. Well, for instance, there is no difference in the Merchants' yard, of course, because both are Government plants—fabricating plants—building the same kind of ship. There is some difference in the tonnage, but aside from that we are on the same basis, practically, as to manner of construction. The other plants, to the extent that they are building individual cargo ships, have not the advantage that we have, because that is the advantage of the fabricated ship, that the material shall come in sequence, and that the riveters shall do the same class of work day after day on the same type of ship, which gives them an advantage.

Senator VARDAMAN. Can you put in more rivets in a given length of time in one place than you could in another?

Mr. BRUSH. Yes, sir; it depends entirely on the class of riveting the man is working on. You take a ship and go right down in there [indicating the midship section of the shell of the model of the A ship; see illustration, p. 255] and put his holder-on and his heater boy inside there, and have him have his gun there [indicating]—and the fellow that can not do a whale of a job there has something the matter with him. But in the tanks and around the deckhouse and other similar work the number of rivets that can be driven per hour or per day is very small in comparison. We have just worked out a plan (with the aid of my assistant, Mr. W. B. Ferguson, who is a brother of Mr. Homer Ferguson, of the Newport News plant) with the Macy Board for that very thing, so as to give us a piece rate on scattered rivets.

Senator NELSON. There is another question I want to ask in that connection: In your fabricating yard, do you get single plates and rivet them in the yard or are some of these plates riveted in sections when they come to you?

Mr. BRUSH. A small percentage of the pieces are riveted when they come to us.

Senator NELSON. You get a lot of those plates riveted in sections, and that saves you a good deal of riveting in the yard?

Mr. BRUSH. Yes; about 17 per cent of the total number of rivets are riveted in the fabricating plants off the island, but it is against us in a way, because the shops who do that riveting have taken advantage of a lot of easy rivets.

Senator NELSON. How do you find that riveting that comes to you on the plate?

Mr. BRUSH. As to its quality?

Senator NELSON. Yes.

Mr. BRUSH. Our men are on the ground at the fabricating plants to inspect it and the piece is not allowed to leave the shop until it is inspected.

Senator NELSON. So that is all right?

Mr. BRUSH. Yes; we have inspectors in every one of the 88 fabricating plants to which steel is shipped from 38 mills.

Senator JONES (interposing). On August 1, the number of rivets driven per gang per day was 104, and on December 1 it was 242? [See chart F–5, p. 265.]

Mr. BRUSH. Yes, sir.

Senator JONES. Were those rivets driven under the same conditions, substantially?

Mr. BRUSH. Yes, sir.

Senator JONES. And were those rivets driven in different parts of the ships, or the same parts?

Mr. BRUSH. In other words, you mean were the average conditions the same? In other words, was the average on December 1 of 242 under the same conditions substantially as the average of August 1 of 104? Mr. Ferguson can answer that, I think.

Mr. FERGUSON. Practically the same.

Senator JONES. If that is true, have you taken steps to ascertain, since you have been there, why only 104 rivets per gang per day were driven on August 1?

Mr. BRUSH. I have.

Senator JONES. Can you tell us why it was?

Mr. BRUSH. I found that at the time they drove 104 rivets per day, they had tailors, bookkeepers, jewelers, florists, and everybody else trying to drive rivets. We put through our training school over 11,000 men, teaching them to build ships. We are entitled to no credit for that school, as I say, because it is a policy of the Fleet Corporation; we have there a corking, fine, capable lot of instructors, about 70, in charge of teaching.

Senator JONES. In other words, on August 1 a large number of the riveters were really inexperienced, so far as driving rivets is concerned?

Mr. BRUSH. Yes, Senator. A man experienced as a riveter did not have to go around last August hunting for a job but a man experienced as a shipbuilder could get a corking good job at any shipyard.

As an evidence of what the school accomplished, I will say that 48 per cent of the riveters now in our employ are men who have gone through the school. We have recently changed our policy at the school, so that those men, instead of working at something in the school yard in order to learn riveting and not produce anything, now actually do riveting on parts of the ship. The information I receive in my office on my daily report of rivets driven shows the number of rivets driven by actual gangs, and also the number driven by the school gangs.

Senator NELSON. Do you pay them by the piece?

Mr. BRUSH. We pay them by the hour while they are learning and just as soon as they get far enough along to get paid for piecework, they are paid by the piece.

Senator VARDAMAN. Can you tell us what those beginners get, and what the experienced men get?

Mr. BRUSH. In the school, under the Macy award, we pay student riveters 56 cents per hour for a period not to exceed six weeks, within which time he becomes a journeyman and is paid the 80-cent rate. We pay student holders-on 48 cents per hour for a period of not to exceed four weeks, within which time he becomes a journeyman and is paid the 60-cent rate. We pay student heaters 46 cents per hour for a period not to exceed two weeks, within which time he becomes a journeyman and is paid the 50-cent rate.

Senator NELSON. All of the three men in the gang get that?

Mr. BRUSH. No; it is 80 cents, 60 cents, and 50 cents; the riveter gets 80 cents, the holder-on gets 60 cents, and the heater boy gets 50 cents an hour.

Senator JONES. They do not get paid, then, by the piece?

Mr. BRUSH. We have a piece rate established by the Macy Board and a large number of our men are working on piecework. The man receives the rates per hour I just mentioned if he is working by the hour. We are trying to put all of our men on piecework as far as we can.

Senator JONES. How much do those experienced men make a day on piecework?

Mr. BRUSH. How much would you say, Mr. Ferguson?

Mr. FERGUSON. Good ones make $70 per week.

Senator VARDAMAN. That is the highest-price man?

Mr. BRUSH. Yes, sir. That is the average earning per week of the best men.

Senator JONES. That is eight hours per day, is it?

Mr. BRUSH. Yes, Senator; eight hours per day.

The CHAIRMAN. You do not work any extra time now, do you?

Mr. BRUSH. I think I ought to answer that question right here, if I may, in some detail. May I answer the question about overtime in detail, because it applies to this question of what these men make?

Senator NELSON. Yes; and also Sundays.

Mr. BRUSH. Yes, Senator Nelson. On November 12, 1918, the day after the armistice, a letter was written by Admiral Bowles to the local representative of the Fleet Corporation reading as follows:

UNITED STATES SHIPPING BOARD,
EMERGENCY FLEET CORPORATION,
Philadelphia, November 12, 1918.

Memorandum to Mr. H. C. HIGGINS,
Authorized Representative.

Please issue the following instructions to the agent:

"Effective Thursday morning November 14, cut out all overtime and Sunday work. Special permission must be obtained for any overtime required to meet emergencies. Work is to be regulated on the basis of economy and efficiency and not on the speed basis."

F. T. BOWLES,
Assistant General Manager.

Then we received this letter from Mr. Piez and Admiral Bowles, dated November 19, 1918. It is called General Order No. 140, and is as follows [reading]:

To: District managers for action.
To: Others for information.
Subject: Sunday work and overtime.

A joint agreement has been entered into by the Secretary of War, the Secretary of the Navy, and the chairman of the United States Shipping Board to eliminate Sunday work and overtime.

The determination of the basic day for the shipyard workers rests with the Shipbuilding Labor Adjustment Board. The board has ruled that eight hours shall constitute a day's work. Rulings concerning Saturday afternoons and holidays are also contained in the decisions of the board. These various rulings are binding upon the shipyards under the jurisdiction of the United States Shipping Board Emergency Fleet Corporation.

No overtime shall hereafter be worked in any shipyard under the jurisdiction of the United States Shipping Board Emergency Fleet Corporation except where ordered by the district manager.

Special Order No. 108—subject, Sunday work in shipyards—is hereby modified to read that no Sunday work shall hereafter be done except where ordered by the district manager.

CHARLES PIEZ,
Vice President and General Manager.
F. T. BOWLES.

Mr. BRUSH. That was handed to our company by their local representative, and since that time we have done no Sunday or overtime work without specific permission of the local representative on the island. When we had a ship ready to deliver, except some small job, or in case we wanted to launch a boat, or had something to do to a tank, or something of that kind, he would permit us to work a minimum number of men overtime. In order that the committee may have a comparison of the view at Hog Island when we were working at night with one taken during the day, I wish to present two photographs: First, a view looking east from Pier A showing the entire 50 shipways taken in the daytime [see illustration, p. 272]; and the other one showing the same view, taken at night [See illustration, p. 273]. Since the armistice we have done very little night work.

Senator RANSDELL. How about Saturday afternoon?

Mr. BRUSH. Our plant closes down at 12 o'clock Saturday noon until 7 o'clock Monday morning.

Senator NELSON. You do not work Saturday afternoon?

Mr. BRUSH. No, sir.

Senator NELSON. Do you pay them for that?

Mr. BRUSH. No, Senator, but I want you to know that the president and his associates work Saturday afternoons and Sundays.

You have before you a chart, No. F–1 [See illustration on insert between pages 260 and 261], which shows the present condition of every keel laid, which I spoke of a few minutes ago. This chart shows both the number and names of the ships, the location of the yard, the percentage of completion of the whole ship, the first five being completed and delivered, all of those being the so-called A ships, and in that connection I wish to present a statement which shows the steel situation, which has been a matter of considerable concern and interest to us. This shows the steel erected and rivets driven at the island up to date, starting in February, 1918, showing the tons of steel erected and the number of rivets driven each month. I knew the rivet drive down to January 27, and I have taken the liberty of estimating the last three or four days in January, so as to get a comparison with the month of December, 1918. The first column is the tons of steel erected; the second is the rivets driven; the next is the cumulative statement—that is, arriving at the total for each month to date—and the third is the cumulative average number of tons of steel erected and rivets driven per month to date. A total of 120,642 tons have been erected, and 17,146,665 rivets have

NIGHT VIEW OF THE SHIPWAYS AT WORK.

been driven, or an average of 1,428,888 rivets a month and an average of 10,054 tons of steel erected per month.

(The exhibit referred to is here printed in full, as follows:)

"F–6–1."

Steel erected and rivets driven at Hog Island to date, Jan. 29, 1919.

Month.	During the month.		Cumulative.		Average per month.	
	Steel erected.	Rivets driven.	Steel.	Rivets.	Steel.	Rivets.
1918.	*Tons.*		*Tons.*		*Tons.*	
February	85	1,845	85	1,845	85	1,845
March	588	14,966	673	16,811	337	8,405
April	2,191	88,282	2,864	105,093	955	35,031
May	5,567	298,332	8,431	403,425	1,392	100,856
June	8,613	586,038	17,044	989,463	1,723	197,892
July	12,688	857,989	29,712	1,847,361	4,952	307,893
August	13,322	1,187,708	43,034	3,035,069	6,148	433,581
September	15,914	2,230,242	58,948	5,265,311	7,368	658,164
October	16,276	2,856,445	75,224	8,121,756	8,356	902,417
November	14,368	3,248,278	89,592	11,370,034	8,959	1,137,003
December	15,049	2,876,631	104,642	14,246,665	9,513	1,295,151
1919.						
To Jan. 27, inclusive	13,551	2,419,399	118,193	16,666,064		
Estimated for January	16,000	2,900,000	120,642	17,146,665	10,054	1,428,888

Mr. BRUSH. In order that you might have in addition to the model some conception of the profile or deck plan of these ships, which is one of the first things I asked for when I took charge, I had this chart prepared. [Exhibiting chart; see illustration, p. 275.]

The outside dark line in both cases refers to the B boat; the broken line the A boat and the dotted line shows the submarine boat that is being built by the Submarine Boat Co., at Newark, N. J., which is a 5,000-ton boat, and our boats 7,500-ton and 8,000-ton.

The thing which struck us most forcibly about the B boat was the very marked difference in design from our A boat and the submarine boat. You will notice that the bowline of the B boat crosses the bowline of both the other boats; you will notice how much sharper it is. The displacement of the B boat exceeds the Submarine Boat Co. boat 89 per cent and our A boat exceeds the displacement of the submarine boat 48.6 per cent. So far as the length is concerned, our A boat, 401 feet long, is 19.5 per cent longer than the submarine boat and our B boat, which is 448 feet long, is 33.5 per cent longer than the submarine boat. I merely wanted to give you a comparison of the three boats.

The CHAIRMAN. It is a great deal larger than the submarine boat?

Mr. BRUSH. Our B boat is 8,000 tons and our A boat is 7,500 tons against their 5,000-ton boat.

The CHAIRMAN. The length of the submarine boat is what?

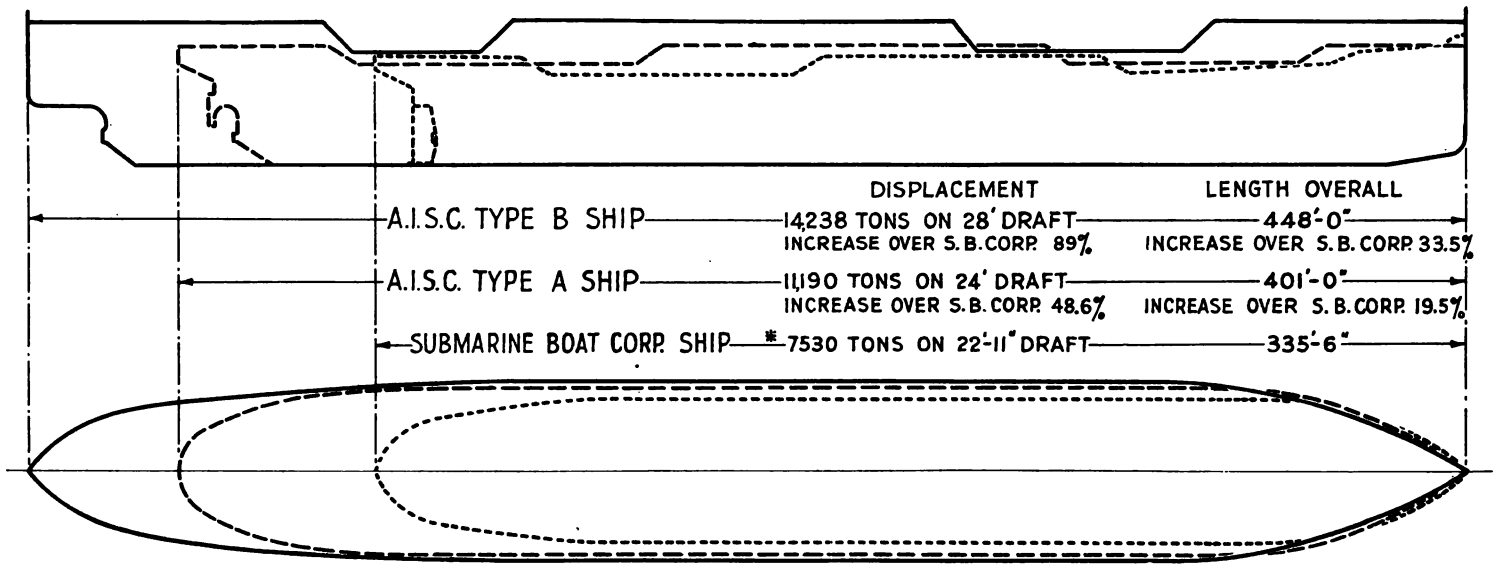
Mr. BRUSH. Three hundred and thirty-five feet and six inches. Our A boat is 401 feet, 7,500 tons, and our B boat is 448 feet and 8,000 tons.

Senator NELSON. How much water do they draw when loaded?

Mr. BRUSH. The draft of the submarine is 22 feet 11 inches; the draft of our A boat is 24 feet and of our B boat is 28 feet.

Senator VARDAMAN. Your B boat has a speed of about 15 knots?

Mr. BRUSH. Yes, sir.



A & B BOATS COMPARED WITH SUBMARINE CORPORATION BOAT

* Supplied by Mr Sadler, Naval Architect of U.S. Shipping Board 140 N. Broad St., Phila. Jan. 25, 1919.

"A" AND "B" BOATS COMPARED WITH SUBMARINE CORPORATION BOAT.

The CHAIRMAN. Was that the draft light?

Mr. BRUSH. No; that was the draft loaded.

Senator NELSON. I notice from the models here that the bottom is flat? [See illustrations, pp. 255 and 256.]

Mr. BRUSH. Yes, sir.

Senator NELSON. I had always supposed in order to make a vessel steady in the water it needed a good deal of keel.

Mr. BRUSH. Senator Nelson, this ship was designed at a time when there was not only a scarcity of shipbuilders, but a scarcity also of material for constructing ships, and the ship was designed by Mr. Ferris with a view of trying to use steel readily rolled not for ship purposes but for other commercial purposes, similar to some British fabricated ships. We did make a bluff at curving a little bit, but principally we tried to build a ship which would not require the highest degree of fitting that they do require in old line ship design and would lend itself to the fabricating principles of doing a tremendous amount of this work elsewhere than on the island.

Senator NELSON. Do you think it is steady in the water?

Mr. BRUSH. All I can say in answer to that, Senator Nelson, is that we had some real sea trial from Norfolk to Cristobal and she did beautifully; but so far there is nothing to indicate that as now designed there is anything wrong with it. It is about like one of those flat-bottomed boats on White Bear Lake, Senator, and you know they will float.

In order that you may have some little conception, perhaps, of just what it means in an effort to assemble these ships, one of the problems which we have been confronted with in connection with our A ships has been that they were designed—the *Quistconck* was completed and the first 8 or 10 all had gun decks on, and we were directed just before she left to take that all off, which we did. In connection with the construction of the ships for war purposes there was a certain amount of reinforcing here on the bow and stern which has required considerable change. Each change in a fabricated ship means a complete change of the blue prints. If you change a rivet a quarter of an inch it means changing our standard plan. Not a ship has a gun or gun deck on it.

The first 50 A ships required 150,000 tons of steel, and every bit of that steel is now on the island except one-tenth of 1 per cent. There are approximately 9,000 pieces of steel, exclusive of liners, in one of the A boats.

Senator VARDAMAN. How many ships have you the material there for now?

Mr. BRUSH. I am taking the first 50 A ships. The steel is on the ground at this moment for all of those ships, except we are short about 150 tons.

Senator LENROOT. That, of course, includes the 14 practically completed, does it?

Mr. BRUSH. Yes, Senator.

Senator VARDAMAN. Have you the material for the other ships contracted for?

Mr. BRUSH. Yes, sir. I am going to give it all. There are approximately 9,000 pieces of steel, exclusive of liners, in each one of the A ships, and 50 ships require approximately 450,000 pieces of steel.

That is, I am talking about the first 50 A ships as they will require 450,000 pieces and it is all there except approximately 2,000 pieces. That is, of the nearly half million pieces, we have all on the island except approximately 2,000 pieces. I am giving this, if I may, Mr. Chairman, because I have heard discussions in your committee here about what the status of material was, not only respecting our ships, but the ships in other yards. We are short for the first 50 A ships 2,000 pieces, including 314 pieces of rejected material at the plant of the fabricators which are being replaced, and that promptly. Those rejections were made by our inspectors at the plants of the fabricators, Senator Nelson, in reply to your question as to who at the plant rejected fabricated material because it was not well done, which cost us nothing, or cost the Government nothing; merely costs the fabricator.

For the 60 A ships there are 3,000 tons of steel in a ship, or 60 ships would amount to 180,000 tons. For the first 20 of the 60 A ships, we required 60,000 tons, and 45,000 tons or 75 per cent of that is on the ground or in transit. That is, it has left the fabricators, which is the same as on the ground to us.

Senator JONES. That is, of the 180,000 tons for the second 60 A ships there are 45,000 tons shipped.

Mr. BRUSH. Yes, sir. For the B ships there are 4,285 tons to a ship—and we were told to consider these ships in two groups of 35 each—35 ships equal 150,000 tons of steel, and we have received or there is in transit to the island 110,000 tons of that 150,000 tons, or 73 per cent, for the first 35 of the 70 B ships. We expect all the steel for the first 35 B ships to be there on or before the 1st of April. Approximately all of the steel for the first 35 B boats is either in the fabricating plants or en route to us.

In other words, in order to make myself clear, for the first 50 A ships the material is all there, practically everything. For the first 20 of the second 60 A ships 75 per cent of the steel is there. Then, going to your 70 B ships, of the first 35, 73 per cent of the steel is there. Now, considering the second 35 B ships, the last 35 of the 70 B ships, of the 150,000 tons required 65,381 tons have been shipped from the mill to the fabricator and 60,000 tons have arrived at the fabricator's and 11,441 tons fabricated and shipped to Hog Island. It is a question of delicate adjustment to determine whether or not any changes in our contract are or are not wise, and that is what your Fleet Corporation representatives are now doing.

When I spoke about the committee appointed by Director General Charles Piez, and which committee visited Hog Island yesterday, I did not mean to leave the impression that this committee was appointed for the sole purpose of considering changes that might be desirable in the ships we are building. What I meant was that Mr. Piez appointed this committee to take up the entire question of ships, and they simply happened to visit Hog Island yesterday, it being one of the plants they wished to visit.

Senator NELSON. In that connection, if we are not going on to complete this entire program or number of vessels, would it not be a mistake to get more material on the ground?

Mr. BRUSH. Yes, sir.

Senator NELSON. Ought that not to be determined before you get more material on the ground—whether you are going to proceed, or how far you are going with the program?

Mr. BRUSH. Senator Nelson, of course the decision as to what the program shall be should be made as promptly as possible. It would be a very serious matter for us to try to stop the flow of materials to the island until we know what to stop; that is, I am very fearful of attempting to interfere with a schedule on which we have worked for 16 months to get going. That has been one of the problems.

Senator JONES. That is a matter you really have nothing to do with?

Mr. BRUSH. No, Senator; it is none of my business.

Senator JONES. Your business is to carry out the contract you have until you are ordered to stop it?

Mr. BRUSH. Yes, sir.

Senator JONES. It is the business of the United States officials to determine what the policy is going to be.

Mr. BRUSH. Yes, sir; and if I should take the responsibility of slowing up that material and they should not make any change, then I would be very much at fault for not complying with my contract to continue to build the ships as rapidly as economy and efficiency would permit.

Senator JONES. Your company is asked to carry on that contract?

Mr. BRUSH. Absolutely. We want to finish our job.

Senator JONES. You are going to push it just as far as you can until stopped by the Emergency Fleet Corporation?

Mr. BRUSH. Yes, sir; our contract requires us to push it as far as we can subject to instructions, since the armistice, not to work any overtime.

Senator VARDAMAN. The last 35 of those B ships you have not any material on the ground for?

Mr. BRUSH. Yes; we have 11,441 tons; we have 11,441 tons fabricated, either on the ground at Hog Island or in transit.

Senator JONES. What per cent is that of the total?

Mr. BRUSH. That is of the 150,000 tons?

Senator VARDAMAN. About one-third or about one-half?

Mr. BRUSH. Oh, less than one-half; 11,441 tons—not quite 8 per cent.

Senator VARDAMAN. I thought you said 70,000 tons?

Mr. BRUSH. No, Senator; all the steel that has been shipped from the mill to the fabricators is 65,381 tons, of which 60,000 tons have arrived at the fabricators.

Senator VARDAMAN. Nearly half?

Mr. BRUSH. Yes, Senator Vardaman.

Senator VARDAMAN. What is the difference in the cost of the material now and a year ago?

Mr. BRUSH. That material would cost at the time bought about 3¼ cents. I do not know what the price of steel is to-day, for ship steel. Perhaps somebody else knows better than I.

Senator JOHNSON. Tell us approximately, please.

Mr. BRUSH. I can not answer that.

Senator JOHNSON. Is it lower or higher?

Mr. BRUSH. I do not think there is any question but what it is lower, Senator.

Senator VARDAMAN. Would it interrupt the course of your explanation if I should ask you now for a rough estimate of the cost of one of these ships, if you should take the contract at this time to build it?

Mr. BRUSH. It would not interrupt me to ask the question, but it would be pretty difficult to answer.

Senator VARDAMAN. Can you tell me what those ships are being built for in this country and in Europe?

Mr. BRUSH. No, sir; I can not.

Senator VARDAMAN. Are there any ships of this character being constructed on private account?

Mr. BRUSH. Not by us.

Senator VARDAMAN. Do you know of any?

Mr. BRUSH. You mean a fabricated ship, or a ship of this tonnage?

Senator VARDAMAN. This tonnage.

Mr. BRUSH. I can not answer that, Senator. I am a pretty busy Hog Island president, and my information in regard to other plants throughout the United States is very limited.

Senator VARDAMAN. The purpose of that question is to ascertain whether or not it would be prudent for the representatives of the American people to go ahead and construct ships that were expected to be used in time of war, at war prices, when we all know they could be built very much cheaper under present or after-war conditions.

Mr. BRUSH. I think, Senator, if I may present it informally, without trying specifically to answer your question, you are going to be governed largely in your decision as a Senator, and that your representatives are going to be governed very largely by whether or not material has arrived and has gone so far toward completion that its destruction or elimination would be a greater waste than to complete the ships.

Senator VARDAMAN. Of course you can not always reach an intelligent conclusion on that subject unless we can know what the ships will cost to build now.

Mr. BRUSH. But, Senator, do you not think in view of Mr. Piez's testimony before you on the general situation he was much better qualified to give you that information than I would be?

Senator VARDAMAN. The last time I asked him he did not have it.

Mr. BRUSH. I think the last time Mr. Piez was here I was in the room.

The CHAIRMAN. The hearing, I think, will show that statement. It has not been printed yet.

Senator VARDAMAN. What was it?

The CHAIRMAN. What it would cost if the contract were let now for ships of that character?

Senator RANSDELL. I do not want to interfere, but it looks to me like this gentleman does not know.

Senator VARDAMAN. I asked the question to find out whether he could tell us. If he can not he can say so.

Mr. BRUSH. I am very sorry, but I am not in a position to give you the information just at the present time.

Senator VARDAMAN. Very well, then go ahead.

Mr. BRUSH. I listened to Mr. Piez and I think he gives you considerable information on that.

The CHAIRMAN. A shipbuilder told me that the French were offering $150 a ton to the British to build the ships, and another shipbuilder told me that the Submarine Boat Co. was building ships for $172 a ton. I do not know whether that is correct or not. That will give you a general idea.

Senator RANSDELL. I would suggest that the witness proceed on the main line.

Mr. BRUSH. I do not think it necessary to take the time of the committee to give you information in detail which does not interest you. Those of you gentlemen who have not been to Hog Island have no conception of what we have there or what the Government owns. The number of pieces of steel and liners required for each A ship is 17,389; for the B ship it is 19,403, and the total number of pieces of hull steel and liners for 180 ships is 3,271,000. The rivets to be driven on the island, for example, for the A ship number 530,000, which is over one-half million, and for the B ship 630,000. The total number of rivets to be driven at Hog Island is 102,000,000, and the total number of rivets to be driven in the fabricating shops is 22,000,000, or a total of 124,000,000. The weight of the rivets for 180 ships is 22,300 tons.

Senator JONES. Does your chart show the amount of rivets you have on hand?

Mr. BRUSH. That would not matter, because they are standard rivets. They come to us in tremendous quantities—by carloads. Do you mean on the question of cancellation, how that would affect us?

Senator JONES. Yes.

Mr. BRUSH. No; it would not, because they are standard. It is your fabricated steel that would cost you, that runs into money so quickly, but you could cancel the order to-morrow morning and not lose much money on rivets because they are all standard rivets.

As an evidence of the amount of the work and material there, if you took the rivets that are going to be used on Hog Island and rolled them into one seven-eighths rivet you would have a rivet approximately 4,200 miles long. That will give you some conception of what we are really doing there. There is one feature, which perhaps may be of interest to you, or which was at least interesting to me, is that the area punched out for these rivets would equal 1,040,000 square feet, or approximately 24 acres. This is the total area of the rivet holes punched out of the steel.

Senator NELSON. That is just the holes?

Mr. BRUSH. That is just the holes, Senator Nelson. The actual steel used in the completion of this order is the equivalent of 20 times the steel used in the Grand Central Station, and 30 times the steel used in the Woolworth Building and 10 times the amount used in the Quebec Bridge and would produce 7 city miles of 20-story buildings, 100 feet deep. Enough 90-pound rails could be produced from the steel to lay approximately 4,000 miles of standard, single-track railroad, or considerably more than the distance from Philadelphia to San Francisco.

In this connection I will submit the following statements on ship steel, machinery, and human-interest facts:

(The statements referred to are here printed in full, as follows:)

W-14-B.

JANUARY 29, 1919.

STEEL.

50 A SHIPS.

Three thousand tons steel, one 50 A ship. First 50 A, 150,000 tons (all on island except 150 tons, or one-tenth of 1 per cent); 9,000 pieces steel in 1 A ship, exclusive of liners; 50 ships equal 450,000 pieces (all here except 2,000 pieces, or four-tenths of 1 per cent); 314 pieces equal rejected material at plant of fabricators and is being replaced by them promptly. Balance in our own shops and being delivered as required.

60 A SHIPS.

Three thousand tons equal one ship; 60 ships equal 180,000 tons; for the first 20 of 60 A requires 60,000 tons; 45,000 tons, or 75 per cent, on island and in transit. All steel for balance in hands of fabricators. All for 20 60 A to be here March 20.

70 B SHIPS.

4,285 tons equal one ship; first 35 B ships equal 150,000 tons; we have received and in transit to date 110,000 tons, or 73 per cent; only 1,500 tons steel yet to be shipped to fabricators, but is not holding up fabrication of sequence material, expect all steel for first 35 B ships to be here by April 1.

Second 35 B ships require 150,000 tons; 65,381 tons shipped from mill to fabricator; 60,000 tons arrived at fabricator; 11,441 tons fabricated and shipped from fabricator.

Second 20 of 60 A ships require 60,000 tons; 55,254 tons shipped from mill to fabricator; 50,000 tons arrived at fabricator; 16,861 tons fabricated and shipped from fabricator.

Third 20 of 60 A ships require 60,000 tons; 14,465 tons shipped from mill to fabricator; 12,200 tons arrived at fabricator; 3,668 tons fabricated and shipped from fabricator.

Recapitulation of hull steel requirements—Tons fabricated steel required to complete contract.

	Tons.
First 50 A ships	150,000
First 70 B ships	300,000
First 60 A ships	180,000
Total, 100 per cent	630,000

Fabricated steel on island and in transit.

	Tons.
First 50 A ships	149,850
First 35 of 70 B ship	110,000
Second 35 of 70 B ships	11,441
First 20 of 60 A ships	45,000
Second 20 of 60 A ships	16,861
Third 20 of 60 A ships	3,668
Total, 53.5 per cent	336,820
Balance to come, 46.5 per cent	293,180
Total required, 100 per cent	630,000

[W-61, Jan. 29, 1919.]

SHIP STEEL AND MACHINERY—HUMAN-INTEREST FACTS.

Hull steel.—Number of pieces of steel and liners required for—

A ship	17,389
B ship	19,403
Total number of pieces hull steel for 180 ships	3,271,000
Rivets:	
A ship	530,000
B ship	630,000
Rivets to be driven at Hog Island	102,000,000
Rivets to be driven in fabricating shops	22,000,000
Total	124,000,000
Weight of rivets—tons	22,300

This tonnage rolled into seven-eighth inch rivets, round, would extend a distance of 4,200 miles.

Rivet holes.—Number of, 337,590,000; average size, seven-eighths inch diameter. The area punched out for these rivets would equal 1,040,000 square feet, or approximately 24 acres.

Hull steel required for A ship, 3,000 tons; for B ship, 4,285 tons; total for 180 ships, 630,000 tons.

Comparisons of hull steel.—This quantity of hull steel would produce any one of the following items: (*a*) Twenty Grand Central stations; (*b*) thirty Woolworth buildings; (*c*) ten Quebec bridges; (*d*) seven city miles of 20-story buildings 100 feet deep; (*e*) enough 90-pound rail could be produced from the hull steel to lay approximately 4,000 miles of standard single-track railroad or considerably more than the distance from Philadelphia to San Francisco.

Shell-plate laps.—Equal 325 miles, all of which is double riveted.

Draftsmen.—In August, 1918, the maximum number working on hull steel was 220; machinery and outfitting, 189; total, 409.

Blue prints.—Daily production of blue prints, 10,000. Number of blue prints made during the past six months, 1,250,000, requiring 9,000 rolls of paper, or 510 miles of blue-print paper, approximately distance between Washington and Detroit, Mich.

MACHINERY AND EQUIPMENT.

Turbines and boilers.—Number of turbines, 180; 750 water-tube boilers with combined horsepower of 750,000, which is more than is consumed in the entire Chicago district.

Pumps.—3,130 pumps required for the 180 ships. If operated simultaneously they would pump 2,275,000 gallons per minute, which is greater than the capacity required to provide the entire population of the United States, figured at 30 gallons per day per capita.

Sanitary system.—Equipment required for the 180 ships is sufficient to completely equip 6,000 rooms.

Winches.—Required 2,080 for cargo booms and derricks.

Metal berths.—Number required, 168,440, equivalent to the capacity of 6,500 Pullman cars, and will require 800 flat cars to transport to Hog Island.

Joiner work.—Lumber required is sufficient to build comfortable homes complete for a city of 26,000; about the size of the city of Madison, Wis.

Lifeboats and rafts.—Number required, 6,028. Equipment is capable of carrying a total of 187,356 persons. Will require 1,700 flat cars to transport to Hog Island.

Stacks and uptakes.—The steel plates required would build a water tank having a capacity of 720,000,000 gallons, which is three times the daily supply required for the city of Philadelphia, or would build four single-track subways under the East River.

Shafting.—It requires 10,270 tons; a length of over 5 miles. Will require 300 flat cars for delivery to Hog Island.

Piping.—Miles of piping required, 820, which must be bent and fitted, and will require more than 1,000 fully loaded cars for delivery to Hog Island.

Valves, flanges, and fittings.—Over 3,000,000 in number.

Electrical equipment.—300 miles of conduit, 760 miles of wire, 698,000 lights and outlets, and 11,500 horsepower generating capacity.

Mr. BRUSH. I do not want to bother you with these figures but some of you gentlemen have not been to the island and I doubt if many people appreciate the magnitude of it. The shell-plate laps equal 325 miles, all of which is double riveted. That is where a part of your steel plate laps over the other. The daily production of blue prints of all kinds is about 10,000, caused in part by the tremendous number of changes in design, some of which changes are being caused by changing the ships since the armistice to make them more suitable for peace-time conditions, which is all beyond our control. This is not any criticism of the Fleet Corporation. Up to the present time all of these changes were necessary. Our machinery and equipment consists of 180 turbines and 750 water-tube boilers to go into the ships, with a combined horsepower of 750,000, which is more than is consumed in the entire Chicago district. Three thousand one hundred and thirty pumps are required for the 180 ships. In order to give you some idea of the capacity of these pumps, if they were operated simultaneously they would pump 2,275,000 gallons per minute, which is greater than the capacity required to provide water for the entire population of the United States, figured at 30 gallons per day per capita. The sanitary system required for the 180 ships is sufficient to completely equip 6,000 rooms.

Senator VARDAMAN. You have not figured as to the height of the pile of silver dollars that has been expended to bring all that about?

Mr. BRUSH. I should be happy to do that.

Senator VARDAMAN. It might be interesting to the people of the United States who must pay the bills to know something about the cost.

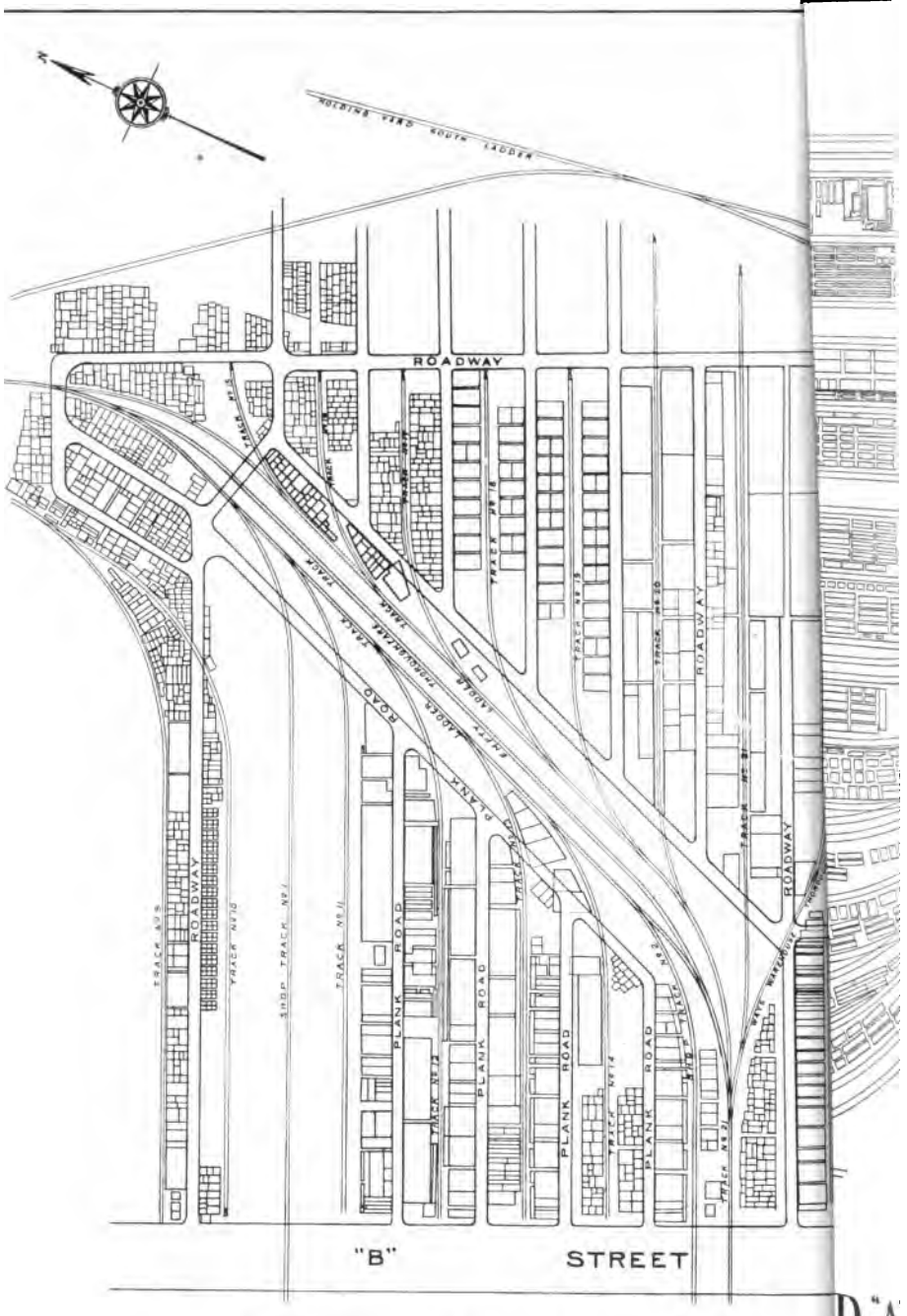
Mr. BRUSH. I should think it would be very interesting, but it would be equally interesting to know these other facts.

In order to fabricate these ships in the manner in which they should be fabricated, we must provide immense storage facilities. I will show you a plat of our so-called yard C exactly as it stands to-day. [See illustration, p. 284.]

There are approximately 3,000 certified locations on that plat, and on each specified plat is a number, which number corresponds to the piece mark of the material in the catalogue, which piece marks are also shown in a sequence catalogue showing the sequence of erection. Each piece of material as it arrives is placed on a specific plat designed for it, so that it can be readily found when wanted, and the fabrication of your ship can proceed by a predetermined schedule of sequence of erection.

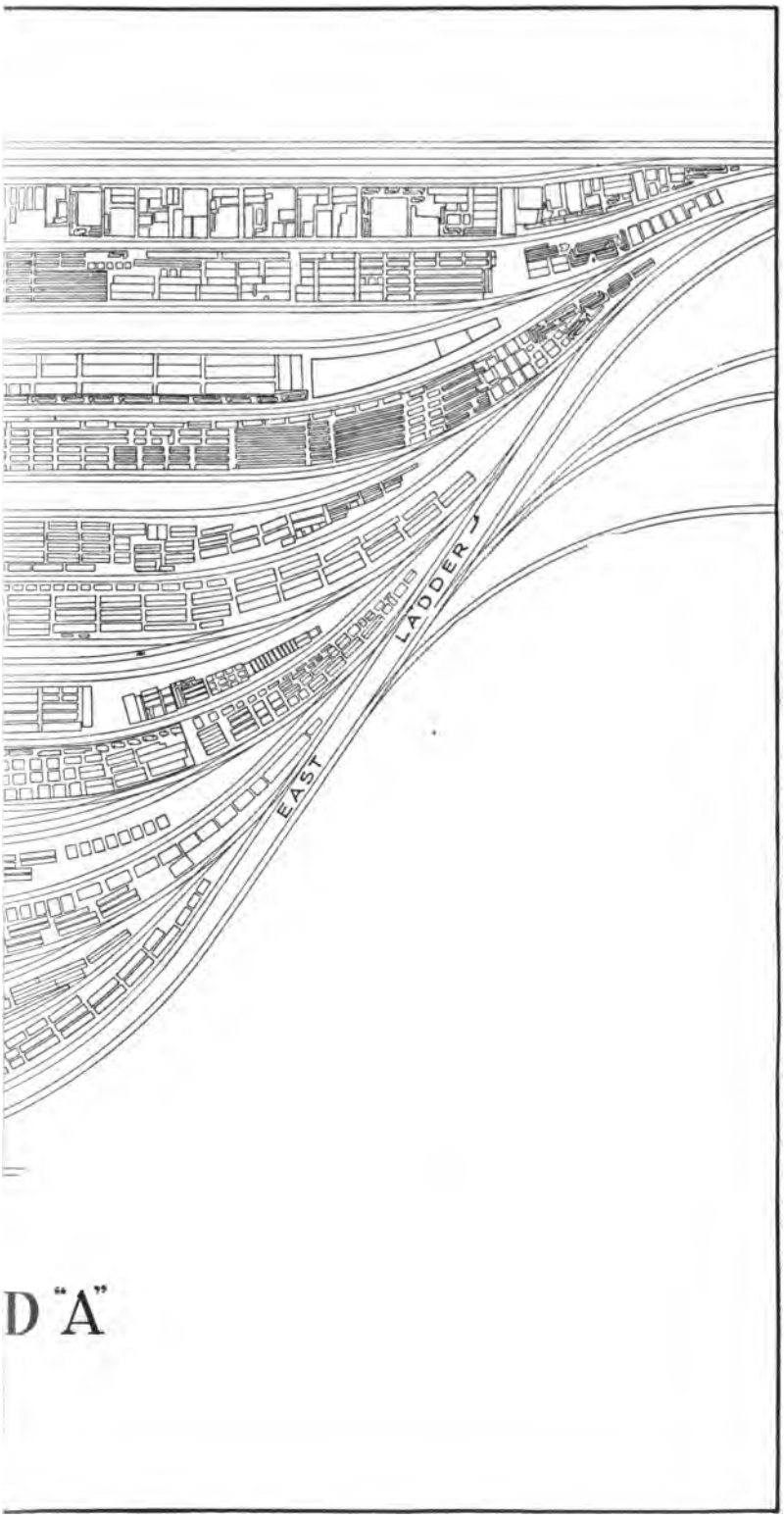
This is what we call yard A [see illustration on insert between pp. 284 and 285], which is the steel storage yard for the A ships. This is an exact plat of the steel yard for the A ships as it now stands, and in this yard there are approximately 9,000 different certified locations for storage of hull steel. There is an acreage of 28.8 and a trackage of 8.7 miles.

In order that you may be familiar with the amount of material on hand at Hog Island, I present herewith two photographs of steel storage yard A which were taken on Monday, January 25th last. [See illustrations, pages 286 and 287.] If you will glance at these pictures you can readily see—and you have asked this very question,



ARRANGEMENT OF MATERIALS
IN STORAGE YARD "C"

0 100 200 300 400
SCALE-FEET



D "A"

Senator Jones—that the work can not be stopped without a large loss on a great deal of it.

Senator JONES. How much more steel have you on hand than necessary to carry on the work as rapidly as planned?

Mr. BRUSH. We accumulated as much fabricated steel as we could, Senator. They apparently scheduled this steel to come to them in some sequence so that it could be used consistently.

Senator JONES. So that they have not an unnecessary amount on hand?

Mr. BRUSH. I do not think they are open to criticism for the amount they have on hand. Experience has shown that it would have been better to have had the steel come to them in a little better sequence, but I will show you in a moment how they worked at it to get their steel, and, of course, I was not concerned at the time; but my impression is, from a close analysis, that they did mighty well under the circumstances under which they had to work. In other words, they had to pull the raw steel from 38 mills to 88 fabricating plants, as far west as Kansas City, and Minneapolis, and as far north as Montreal, Canada, because the steel fabricators in the East could not fabricate it. Of course, it is plainly very difficult to cause many thousands of pieces for one ship to come from 88 different fabricating shops, and have them come in their proper sequence, and not have too many of one kind and not enough of another.

I will now show you a series of photographs, and will only comment upon them in passing.

This photograph is steel yard F [see illustration, p. 288], which is the overflow storage yard for yards A and B. That is the way it comes from the fabricator. These were punched and fabricated when they came to us.

This shows the steel yard B, in which we store the steel for the B ships, and that is where it is unloaded as it comes from the fabricator to us. This B yard contains 44.3 acres of storage space and is served by 11.5 miles of railroad track [see illustrations, pp. 289 and 290].

This photograph shows the pipe yard [see illustration, p. 291], and the other two photographs show the machinery storage portion of yard C; and there are the steam winches that are on the ground [see illustrations, pp. 292 and 293].

Senator JONES. You have the winches there for how many ships?

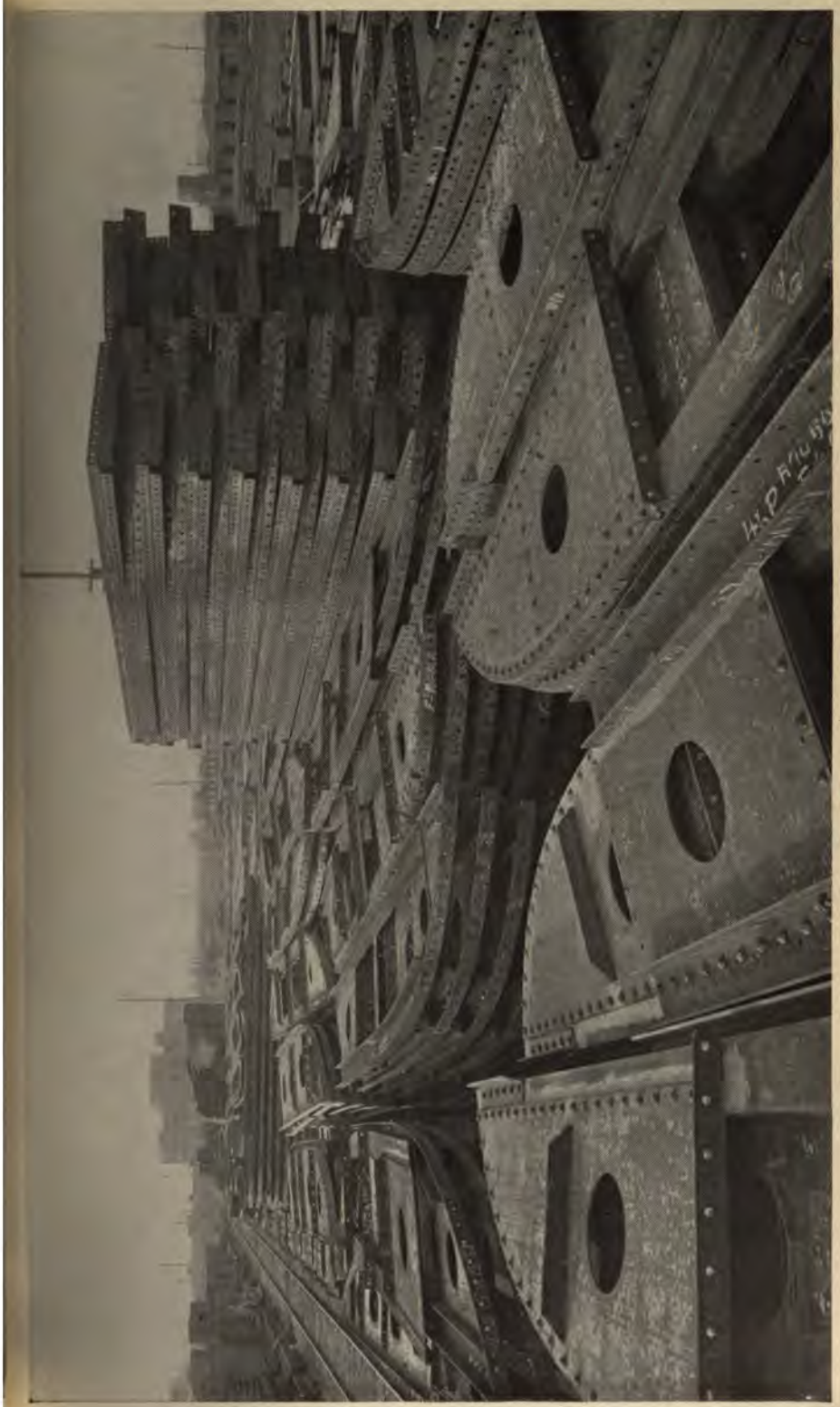
Mr. BRUSH. We have all of the winches for the first 50 A ships—500 in all—10 to a ship. We have none of the winches for the 60 A ships. We require 600—10 to a ship. For the 70 B boats we require 14 to a ship—total of 980, of which, 864, enough for 62 ships, are on the island.

Senator JONES. What was the necessity of getting the winches there for all the ships?

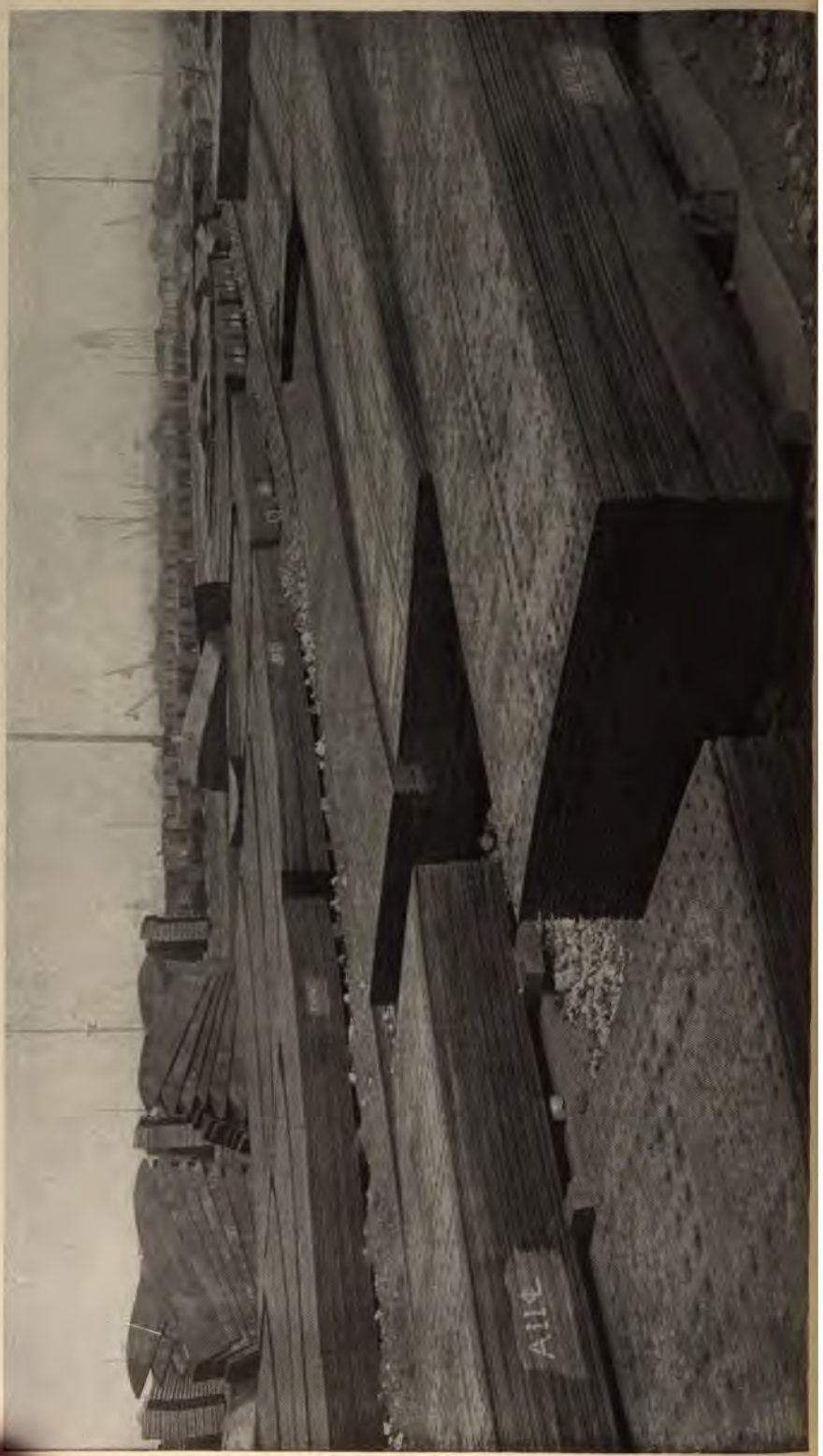
Mr. BRUSH. They should not have been there, Senator. I have not had time to put myself in the position to know, but to the extent that you have an unnecessary number there it should not have been done. Mr. Levy calls my attention to the fact that they are standard winches, and if required by any of the other shipyards, are subject to the orders of the Emergency Fleet Corporation.

Senator JONES. That is, you mean they would not be a loss?

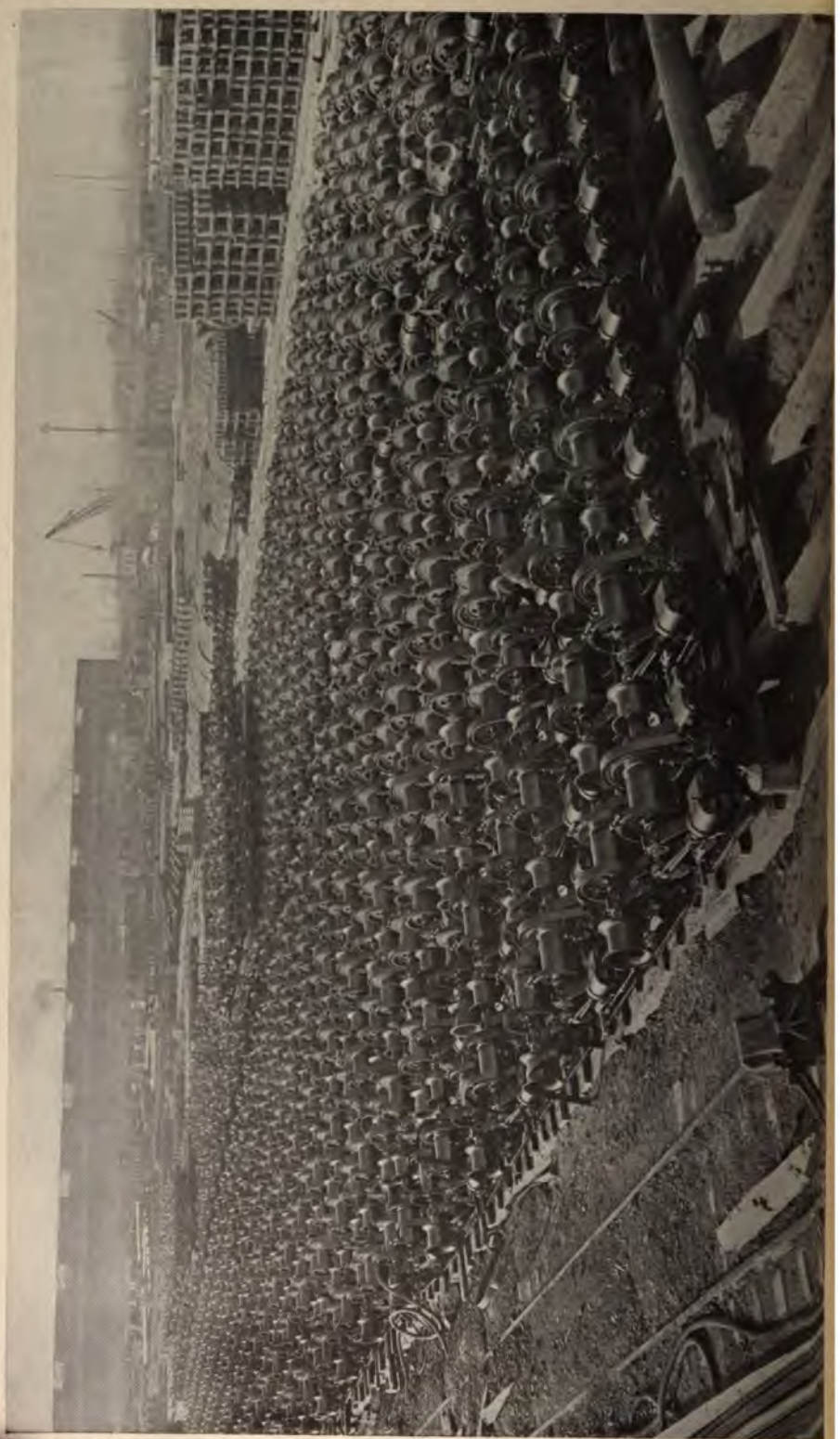
HULL STEEL STORAGE YARD "A."



HULL STEEL STORAGE YARD "B."



PIPE YARD, IN STORAGE YARD "C."



HULL FITTINGS IN STORAGE YARD "C."

Mr. BRUSH. No; they could be used to-morrow, Senator, on practically any ship. There is no loss in this sort of thing at all, and this was one of the many items purchased for us by the Fleet Corporation. We simply advised them of our scheduled program and what we needed, and they furnished to us as they saw fit.

These photographs show yard D, located behind the wet basin, where we store the outfitting that is usually placed on the ships after they reach the wet basin. [See illustrations, pp. 295, 296, and 297.]

Senator JONES. Are they standard [indicating life rafts]?

Mr. BRUSH. Yes, sir.

Senator JONES. Are these standard, too [indicating anchors]?

Mr. BRUSH. Yes, Senator.

The CHAIRMAN. What are those piled up [indicating life rafts]?

Mr. BRUSH. They are life rafts, Senator. This other picture [indicating] shows the turbine engines in storage.

The CHAIRMAN. Where are the life rafts made?

Mr. BRUSH. The life rafts for the first 50 A ships were made by the Welin Marine Equipment Co., Long Island City, N. Y. We require 118 or three for the first 4 A boats and 1 each for the remaining 106 A boats, and all are on the island. The life rafts for the 60 A ships are being made by the Racine Manufacturing Co., at Racine, Wis., and the life rafts for the 70 B ships by the Welin Marine Equipment Co., Long Island City, N. Y.

The CHAIRMAN. Are they made of steel?

Mr. BRUSH. They are two cylindrical steel tanks inclosed in a framework of light wood.

Those are anchors. They are all bought by the Fleet Corporation.

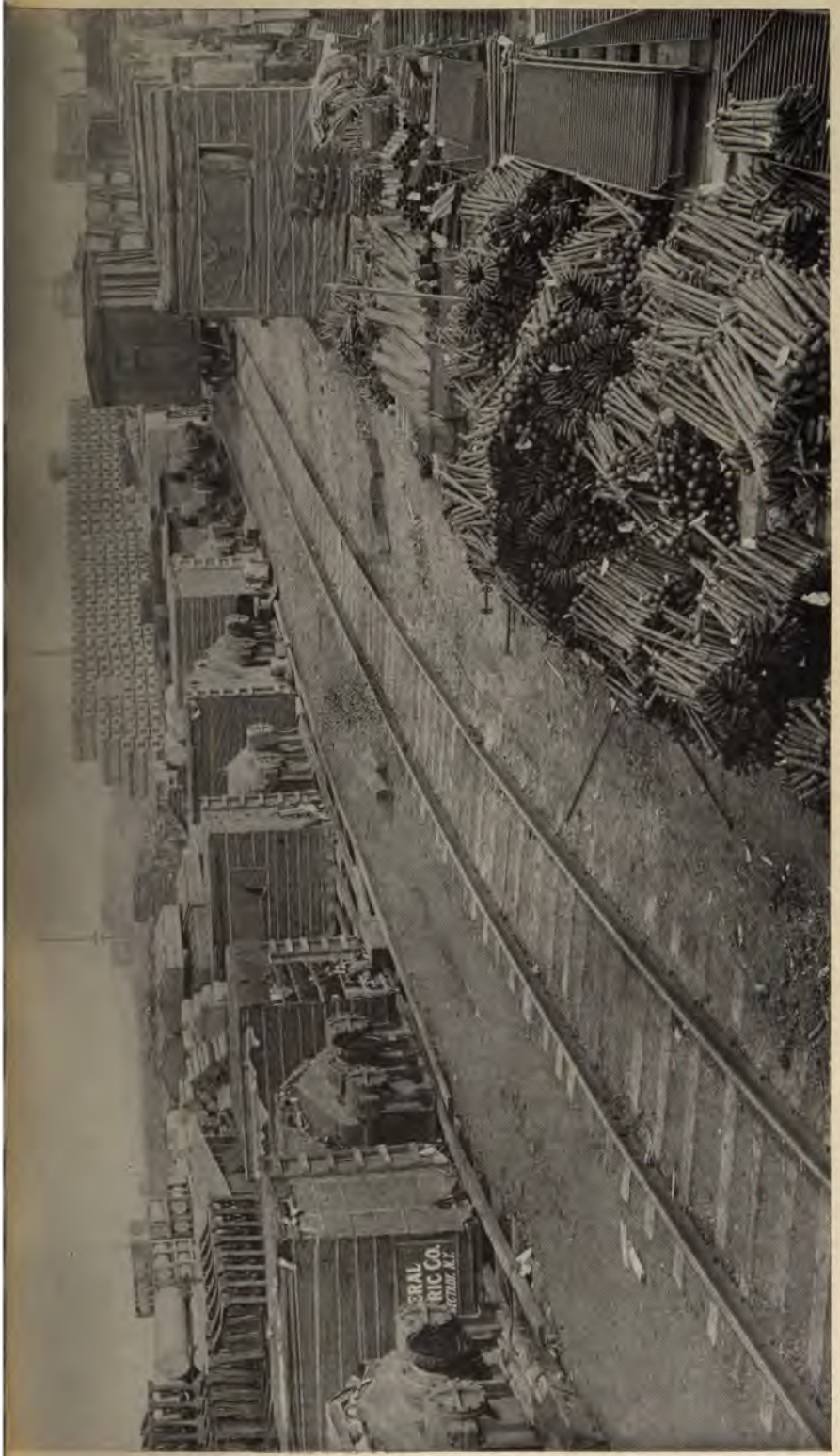
The CHAIRMAN. Are they standard, too?

Mr. BRUSH. Yes, sir; all standard. This is yard E [see illustration, p. 298], where we store what we call our steel liners in proper order according to number. A liner is simply a small piece of steel that is usually placed where two pieces of steel are riveted together. Generally speaking, we require for each ship as many pieces of liners as we do pieces of hull steel.

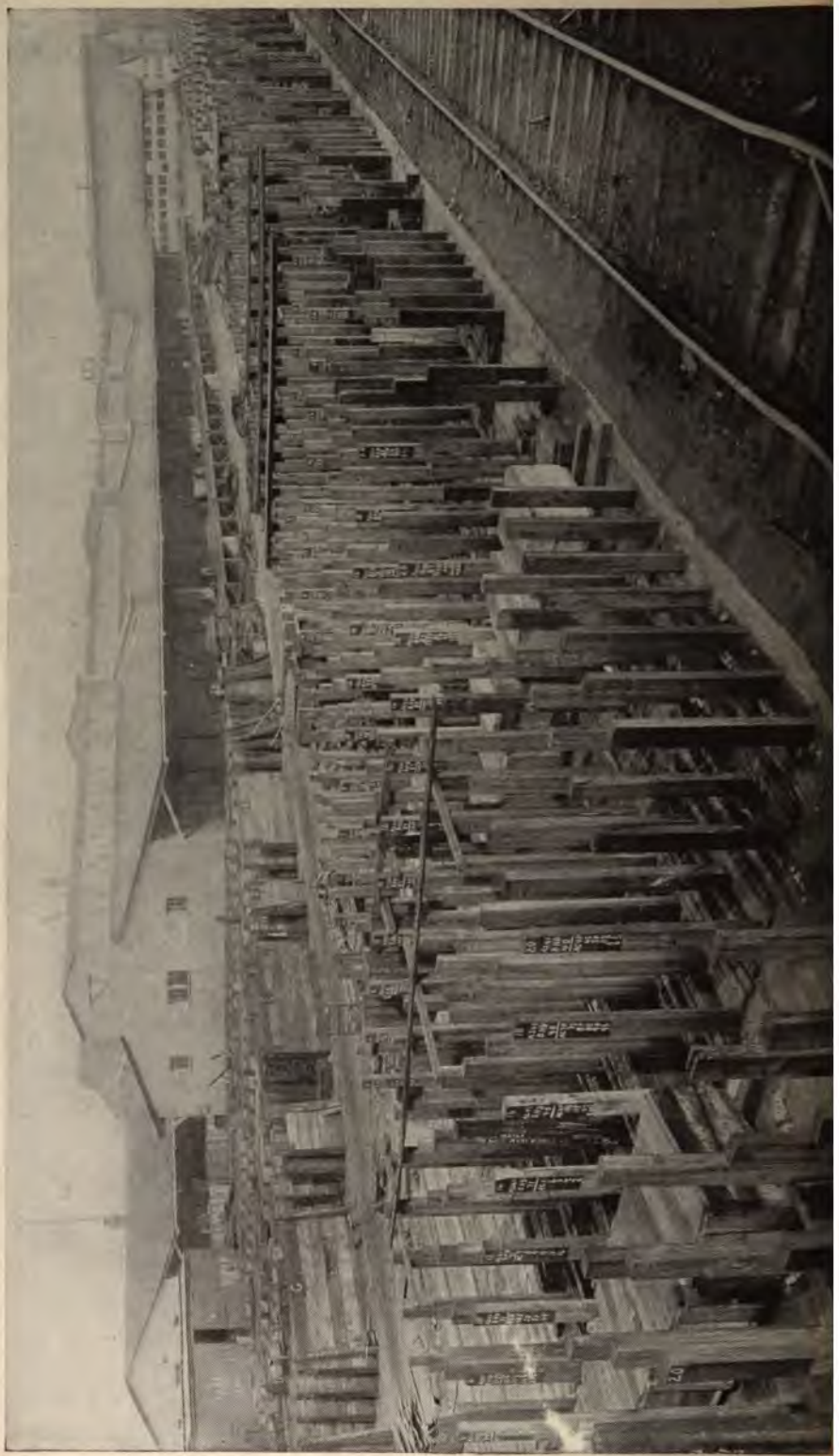
This photograph shows a covered storage platform in rear of warehouse No. 20, where are stored the pipe fittings of 3 inches and over [see illustrations, p. 299]. I do not want to take your time, but I wanted to give you an idea of what was there. This other picture [indicating] is a typical wooden warehouse, of which we have 26 [see illustration, p. 300].

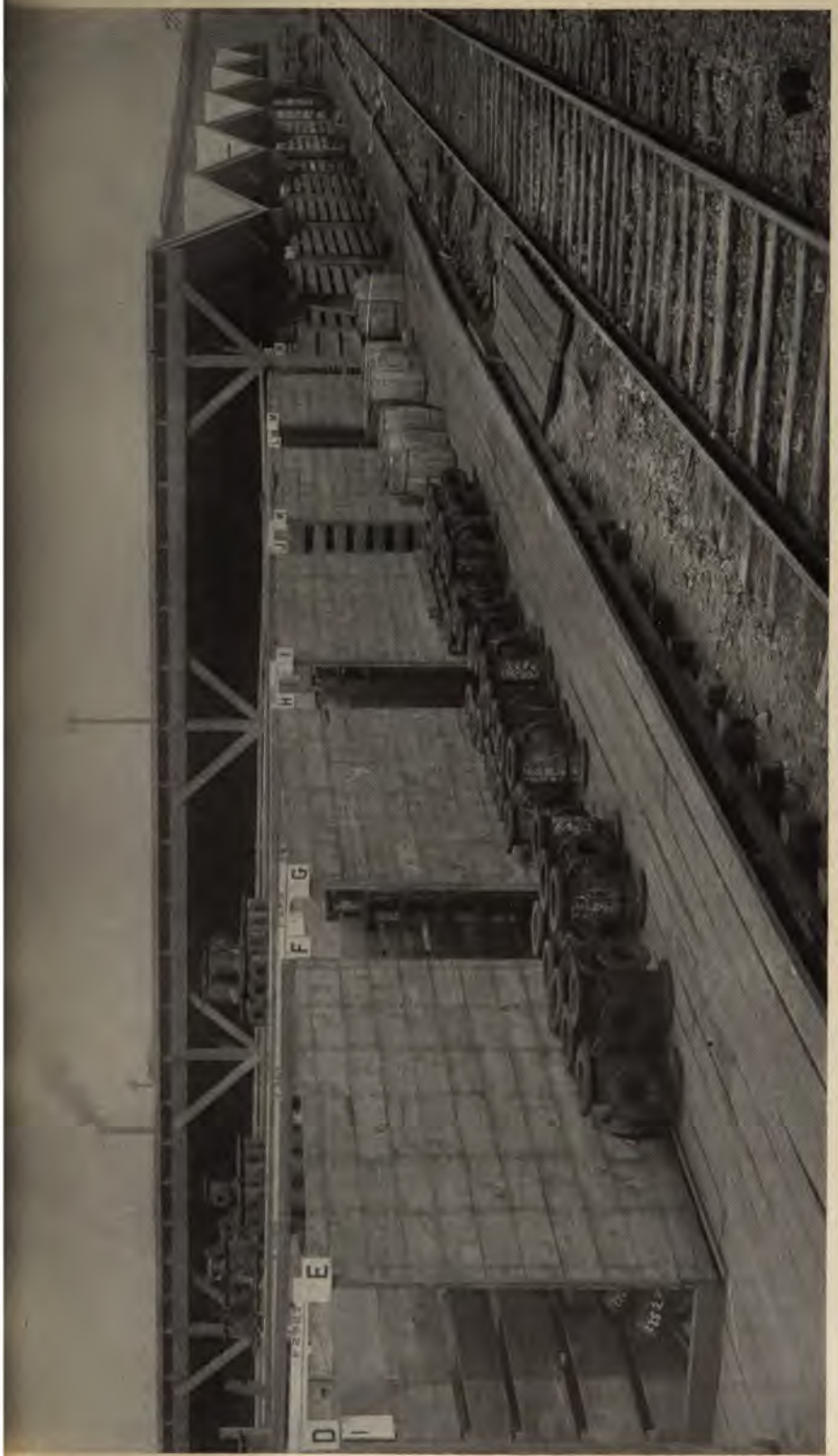
These two photographs [see illustrations, pp. 301 and 302] show the interior and exterior of our reinforced concrete warehouse, which is 172 feet wide and 400 feet long, four stories high, with a steam railroad track in the center. We originally decided to build about 14 additional wooden warehouses, but on conferring with the Emergency Fleet Corporation, both they and ourselves decided it would be cheaper and more desirable to build this large building, which would be a very desirable building for any purpose. This photograph [see illustration, p. 301] is the interior of the same building. This, Senator Ransdell, is the exterior of that same building [see illustration, p. 302]. Incidentally, when the Fleet Corporation and our people decided to build this building, they asked for bids and we made an estimate and it was lower than any bid received. We built it, and it is being built for less.

HULL FITTINGS, STORAGE YARD "D."

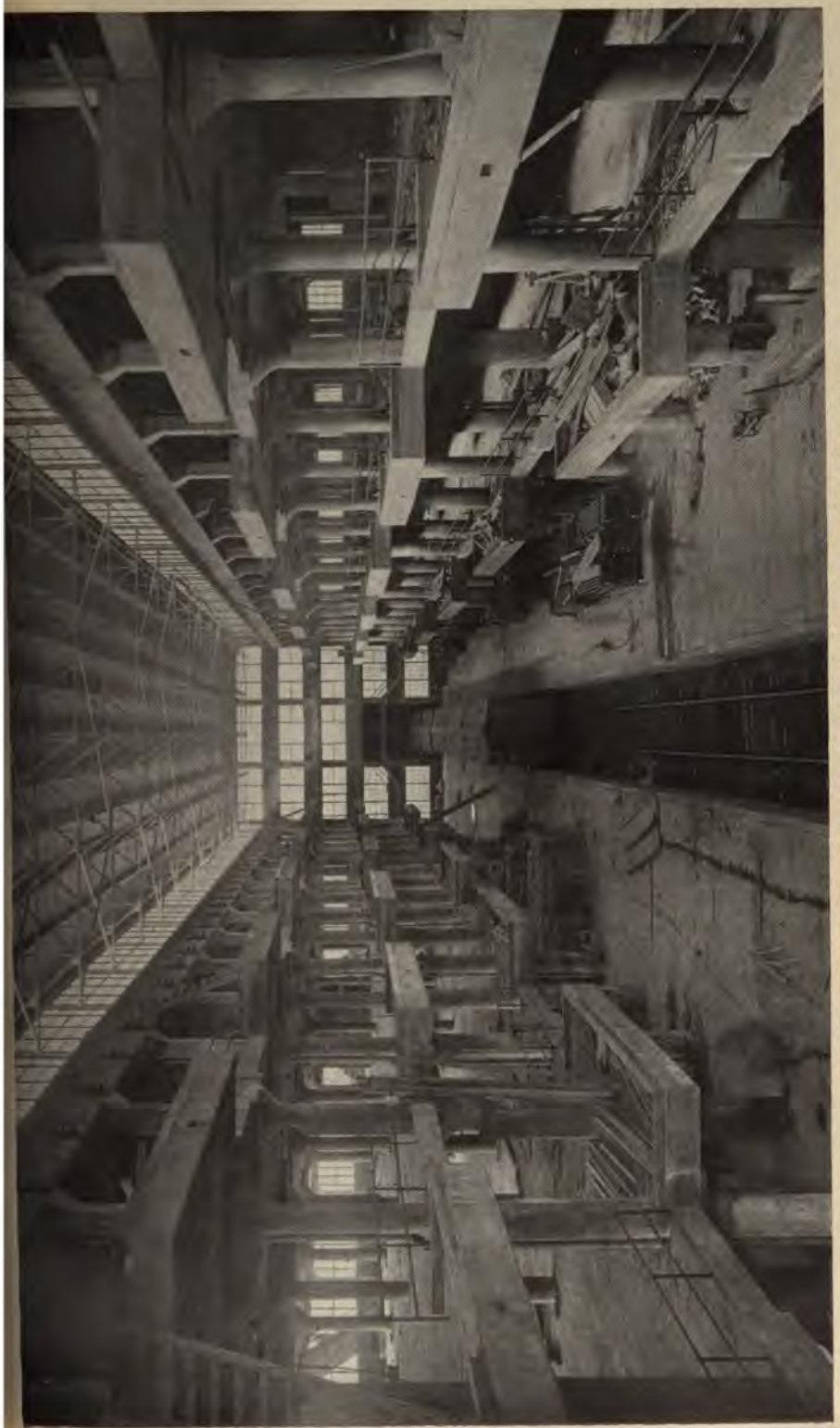


TURBINES AND GEARS STORAGE YARD "D."

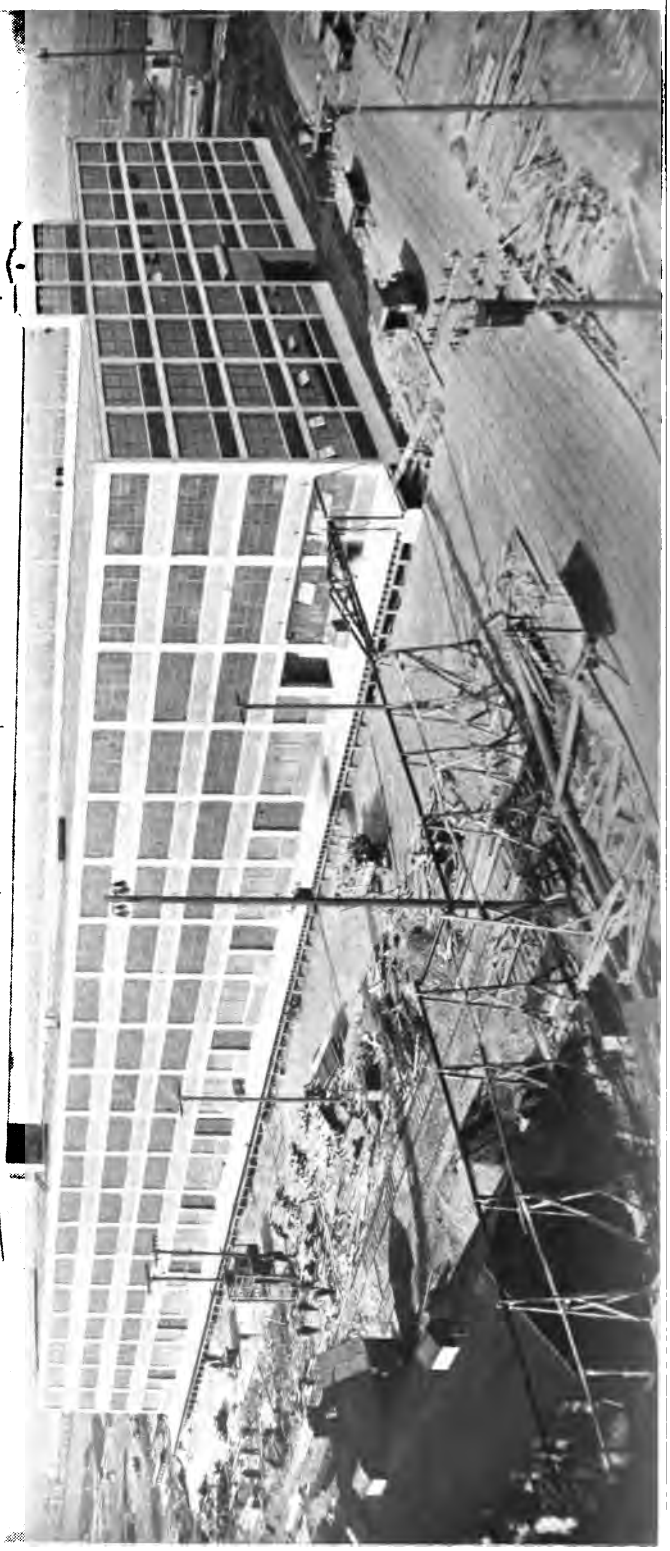




PIPE FITTINGS STORAGE REAR OF WAREHOUSE NO. 20.



INTERIOR OF CONCRETE GENERAL WAREHOUSE (NEARING COMPLETION).



LOCATION
CLEVELAND OHIO
LANCASTER PA.
PINE FORGE PA.
PHOENIXVILLE PA.
YOUNGSTOWN OHIO.
SHARON PA.
CANTON OHIO.
CLAYMONT DEL.
YOUNGSTOWN OHIO.
YOUNGSTOWN OHIO.
GLASGOW PA.
NEW CASTLE DEL.
COLUMBIA PA.
CRUMM LYNN PA.
CHICAGO ILL.
PITTSBURG PA

This photograph [see illustration, p. 304] is what we call our Records Building. In this building we maintain our records of all material, as well as our time-keeping records, and also store the tracings of all our blue prints, and it is necessary to provide a fireproof building for this purpose—anything else would be a serious mistake. This photograph [see illustration, p. 305] shows a section of our time-keeping office in the Records Building.

In order that the committee might realize the huge problem of moving our raw steel from 38 steel mills to 88 fabricators, and from the 88 fabricators to Hog Island, I have prepared and now desire to present a chart showing the 617 different routes this steel must move over [see illustration on insert between pages 302 and 303].

Our hull fabrication department forwarded the schedules for ship steel to the director of steel supply of the War Industries Board at Washington, who secured the allocation of the steel from the American Iron and Steel Institute, and instructed us to place our orders with the mills which they selected to roll the material. Priority rating was for a time secured by direct application to the War Industries Board and later was placed on the automatic priority list.

Our people had to go out and hunt for fabricators to fabricate the steel; the locations indicated by a number over 100, showing the rolling mills [see illustration on insert between pages 302 and 303], and the locations indicated by numbers under 100 are the fabricating mills. After the people at Washington allocated the steel to the different rolling mills to go to the 88 fabricating plants, our people had to go out in the open market and contract with the fabricators for fabricating the steel.

We had to have a definite schedule laid out and had to instruct that it be routed over a specific railroad, both for the movement from the steel mills to the fabricators' plants and from the plants of the fabricators to Hog Island. There are 617 of these routes for that steel to cover, from 38 mills to 88 fabricators and from 88 fabricators to Hog Island, and you can see where the steel went to and from. We went as far West as Kansas City, Omaha, Minneapolis, and St. Paul, in the Chicago district and the Ohio district, and as far up as Montreal into Canada and two other places in Canada, and, of course, into Detroit and Toledo.

The CHAIRMAN. Where did you move it from?

Mr. BRUSH. It moved from this district [see illustration on insert between pages 302 and 303]. It moved from the rolling mill district to all these fabricating plants and back to Hog Island.

Senator VARDAMAN. Where is the rolling-mills district?

Mr. BRUSH. The 38 rolling mills that furnish raw steel to our 88 fabricating plants are located as follows [reading]:

Pennsylvania	22
New York	2
Illinois	5
Ohio	6
Indiana	1
Delaware	2
Total	38

Senator JONES. You have not been called upon at any time to pass upon the wisdom of the plan in the beginning?

RECORDS BUILDING.

SECTION OF TIMEKEEPING OFFICE—RECORDS BUILDING.

Mr. BRUSH. No, Senator Jones; I have been informed by the men, both the representatives of the Fleet Corporation and the men in charge of the property, it was either that or no steel; that we could not get the fabricators in this district to do very much fabricating.

Senator JONES. You have not been called upon on that?

Mr. BRUSH. No, sir.

Senator VARDAMAN. It necessarily involved a scarcity in the steel?

Mr. BRUSH. Yes, sir. There is no question about it, Senator. That situation, since the armistice was signed, is now gradually changing, and we are taking advantage of it, with the cooperation of the Fleet Corporation, by pulling that steel in and using the car plants in the Pittsburgh district, like the Pressed Steel Car Co. and the Standard Steel Car Co., and the big plants of the McClintic-Marshall Co., which were provided by the Fleet Corporation through the special efforts of Admiral Bowles, and the other plants that now have an opportunity to do this work were at the time we tried to get them to undertake to do it without the proper facilities, so as promptly as we came under these conditions we have combined to take advantage of them.

Senator VARDAMAN. Drawing in the area, the cost is less, I understand?

Mr. BRUSH. Yes, Senator.

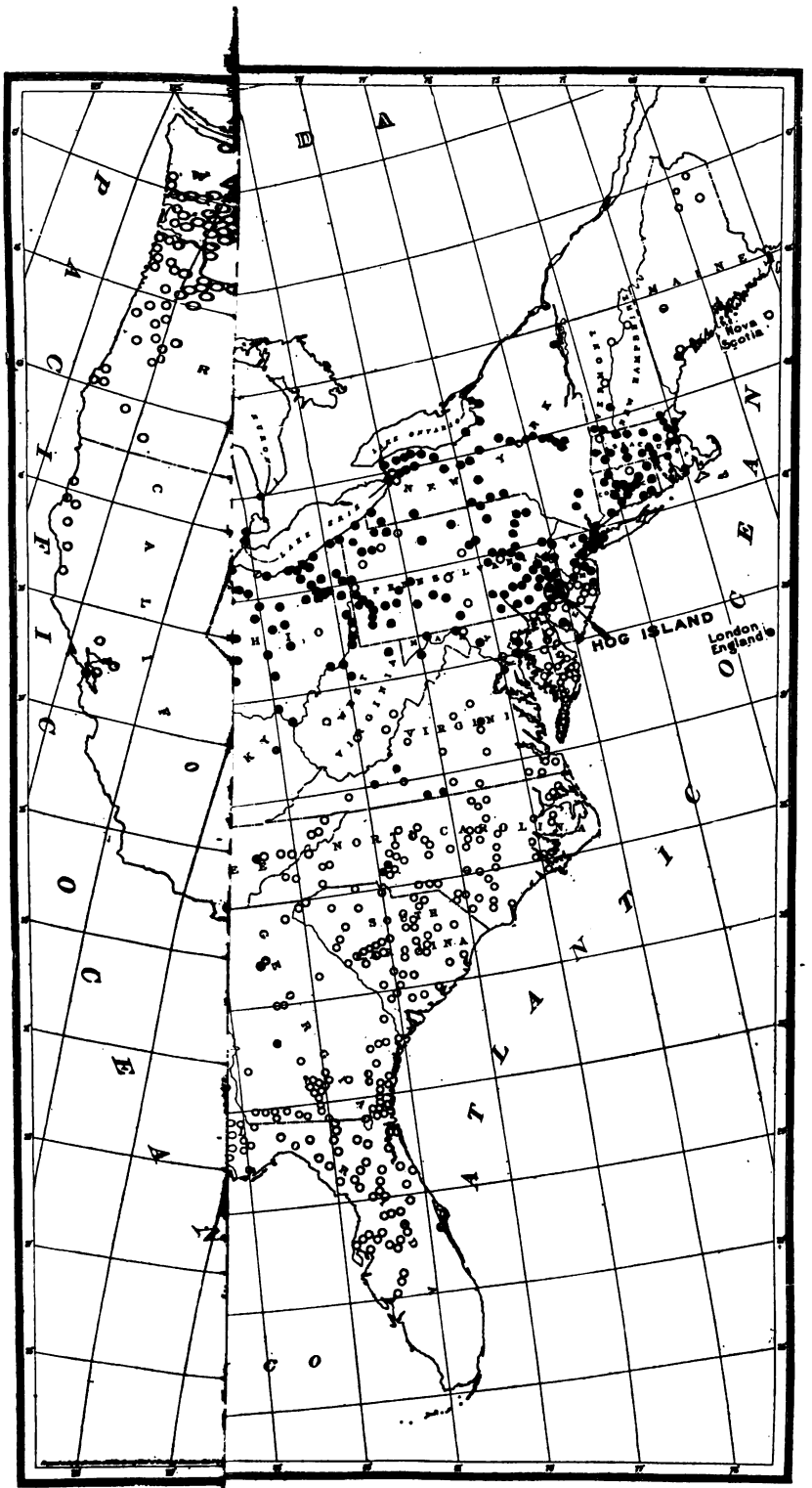
Senator NELSON. You saved freight both ways?

Mr. BRUSH. Yes, sir; we saved freight both ways, and that is being done with the utmost cooperation and teamwork of the Fleet Corporation and representatives from our company. In order to show you some of the problems that we went up against in order to get this material, this map [see illustration on insert between pages 306 and 307] shows the places where the lumber and all material for the plant and the ships (other than hull steel) was purchased. We did not buy all of the lumber ourselves—we were required to purchase practically all of our lumber through the Fleet Corporation.

All Government shipbuilding plants that required lumber, placed their order with the Fleet Corporation, and the Fleet Corporation undertook, through the Lumber Bureau at Washington, and that bureau through the various so-called emergency lumber bureaus which existed through the South and West, to distribute the orders between the different mills in a fair and proper manner. In most instances we received only information as to where the lumber which we had ordered from the Fleet Corporation came from, which information came to us from lumbermen located in these several emergency bureaus on the Pacific, the Gulf, and South Atlantic coasts weeks and months after the material had been shipped. It was usually the rule for lumber to arrive at Hog Island on which we had absolutely no information. All we could do was to take the number of the car and the description and quantity of the lumber and check the car back against the bill of lading which we received later, and, when we received the invoice from the shipper, check it back against our order and match up the record of the arrival of the car and description of contents with the bill of lading and invoice.

Senator NELSON. What do the open circles and black dots indicate?

Mr. BRUSH. The open circles indicate lumber purchases and the black dots miscellaneous material for both plant and ship; the open circles and the black dots indicating where the material covered by the 66,631 orders came from.



97215°—19. (To TO HOG ISLAND.

Senator RANSDELL. I notice a great deal of the lumber is from the Great Lakes district and much from the Pacific coast.

Mr. BRUSH. Not much lumber from the Great Lakes, Senator Ransdell.

Senator RANSDELL. You have some open circles there.

Mr. BRUSH. We only received lumber from 24 mills in the Great Lakes district, as follows: Three mills in Michigan, 20 mills in Wisconsin, and 1 mill in Minnesota, Senator Ransdell.

Senator RANSDELL. I see a number of open circles there.

Mr. BRUSH. Yes, Senator Ransdell; the 24 shipping points I just mentioned.

Senator VARDAMAN. The open circles indicate where the lumber came from?

Mr. BRUSH. Yes, sir. Most of it came from the South.

Senator RANSDELL. Yes, sir; I know we have more lumber there than any place, except in Senator Jones's country.

Mr. BRUSH. Those are the specific points at which purchases were made on our account.

At the time of the last liberty-loan campaign, our locomotive crane boys placed 45 of their 70 locomotive cranes together and made a picture of them [see illustration, p. 308]. These men were trying to carry on a campaign of their own.

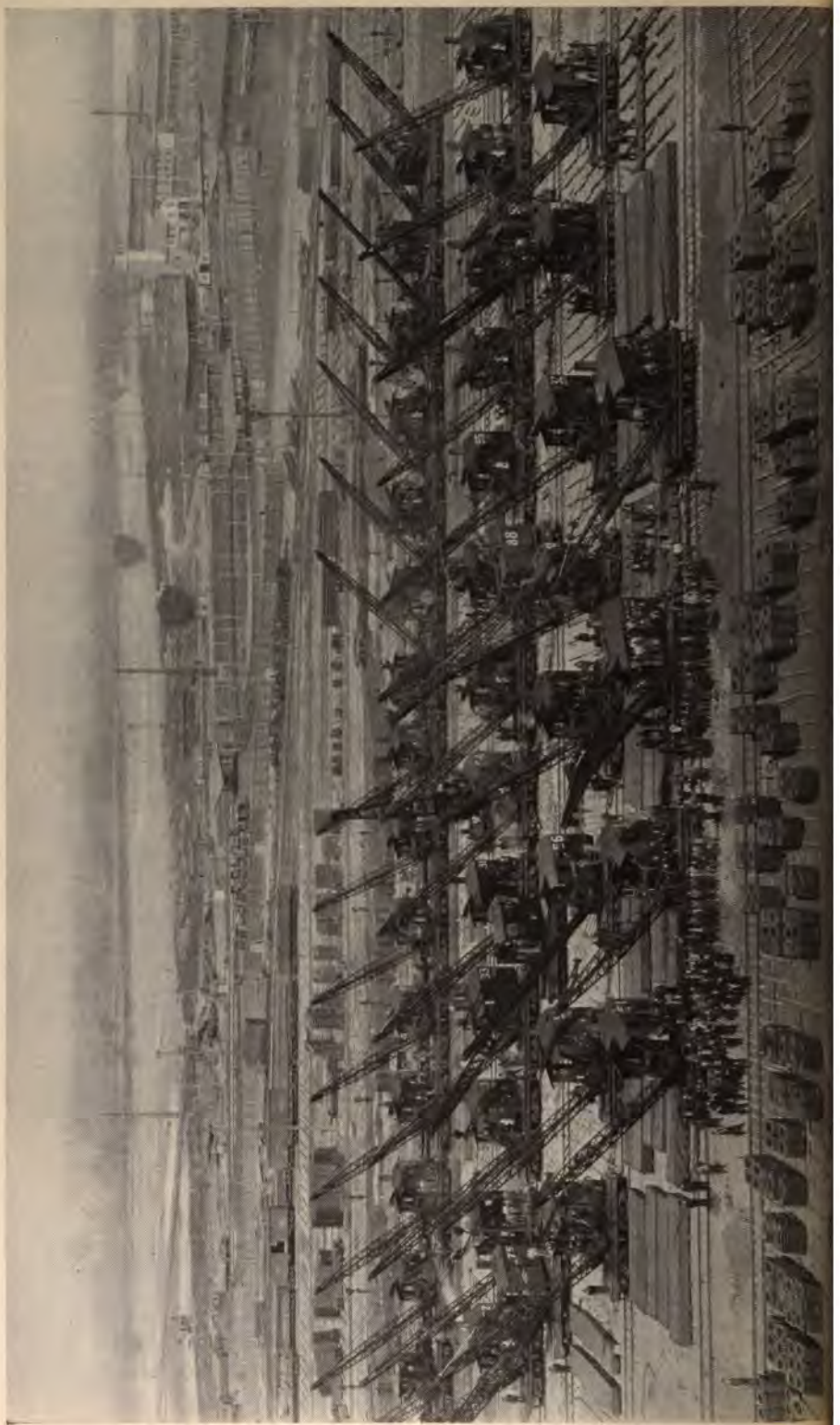
This is the bank building, which is a permanent building [see illustration, p. 309]. Our pay roll being approximately $4,000,000 a month—all labor being paid off in cash—it was impossible, of course, to build other than a fireproof, permanent building for that purpose.

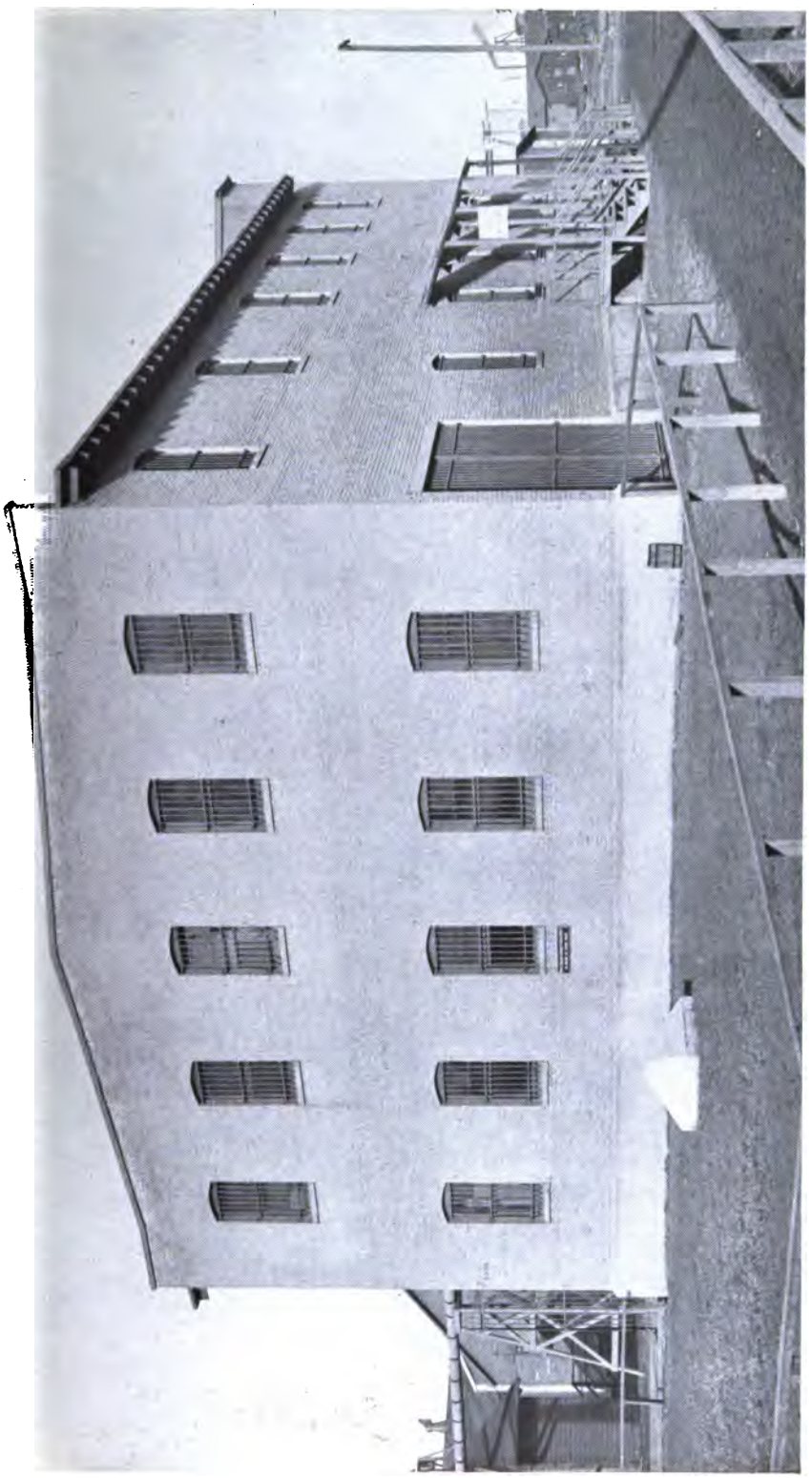
This photagraph shows the inside of our plate and angle shop [see illustration, p. 310]. They built these shops with the idea (there never having been fabricating shipyards built before so far as we know on any such plan as these) that there would be a substantial amount of correction work to be done. As a matter of actual fact, the fabricating work has come in such excellent shape that in order to avail ourselves of the shops, we are actually doing fabricating ourselves on the ground, which it was not originally anticipated we would do, because the amount of correction work was almost nil.

This photograph [see illustration, p. 311] shows the shop building group, and they are of steel frame construction covered with corrugated iron; are fireproof, and I inquired about that immediately and found it was cheaper to erect a building of this size of that material than to attempt to build it of wood and it gives us a permanent building.

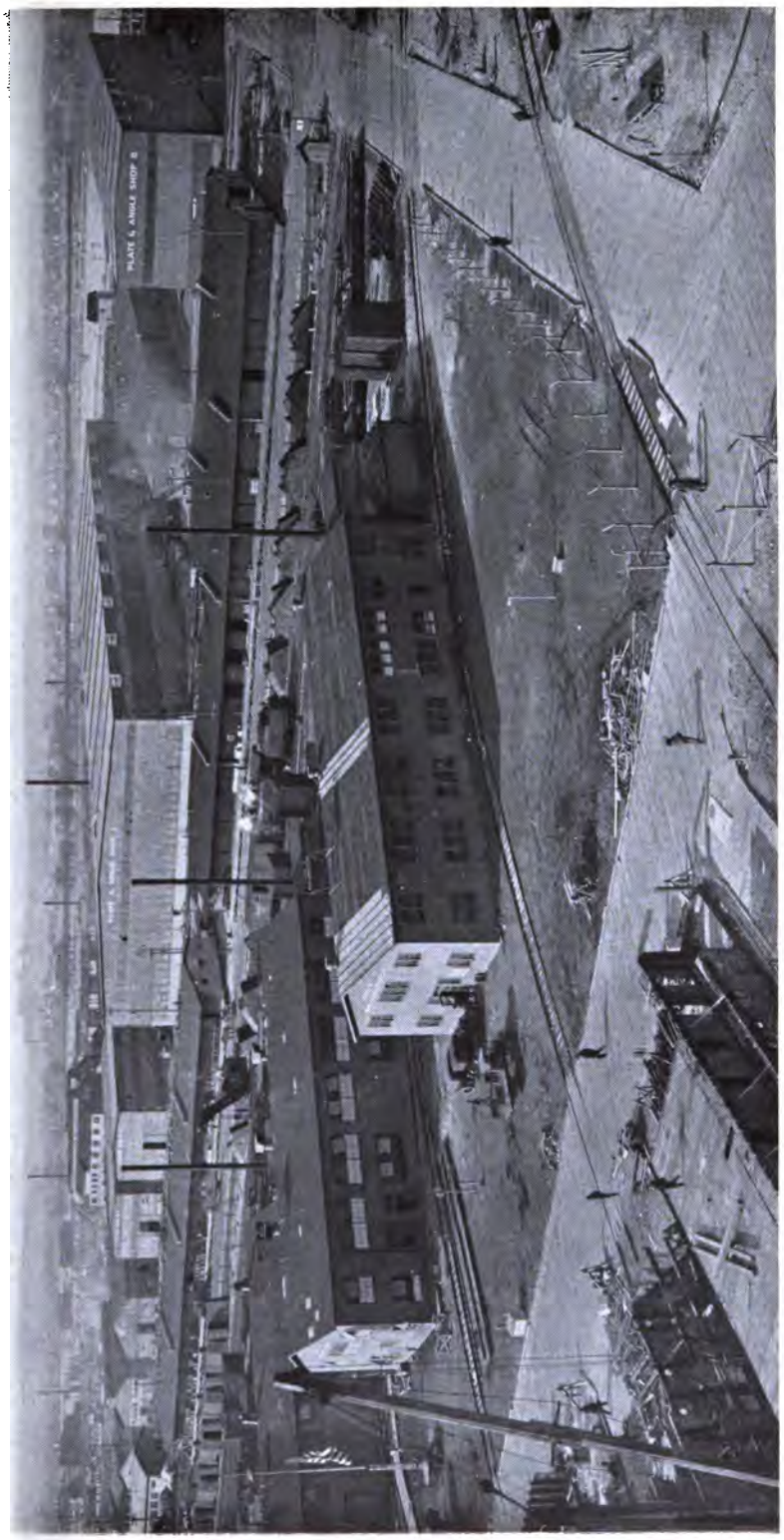
When it came time to install telephones, the telephone company would not permit their switchboard to go into a frame building, and our telephones are the "nerve center" of our entire job, and it would have been extremely unwise to have permitted a condition which might make possible its loss by fire. Therefore this brick telephone building was built [see illustration, p. 312].

I will not bother you talking about these photographs further, but they do show in a very graphic manner just what the boys were up against in building this plant during Arctic weather, and for that reason it would please me if the committee would find it consistent to print them in the record. [See illustrations, pages Nos. 313 and 314 and pages 316 to 340.] That was on September 20, 1917 [see

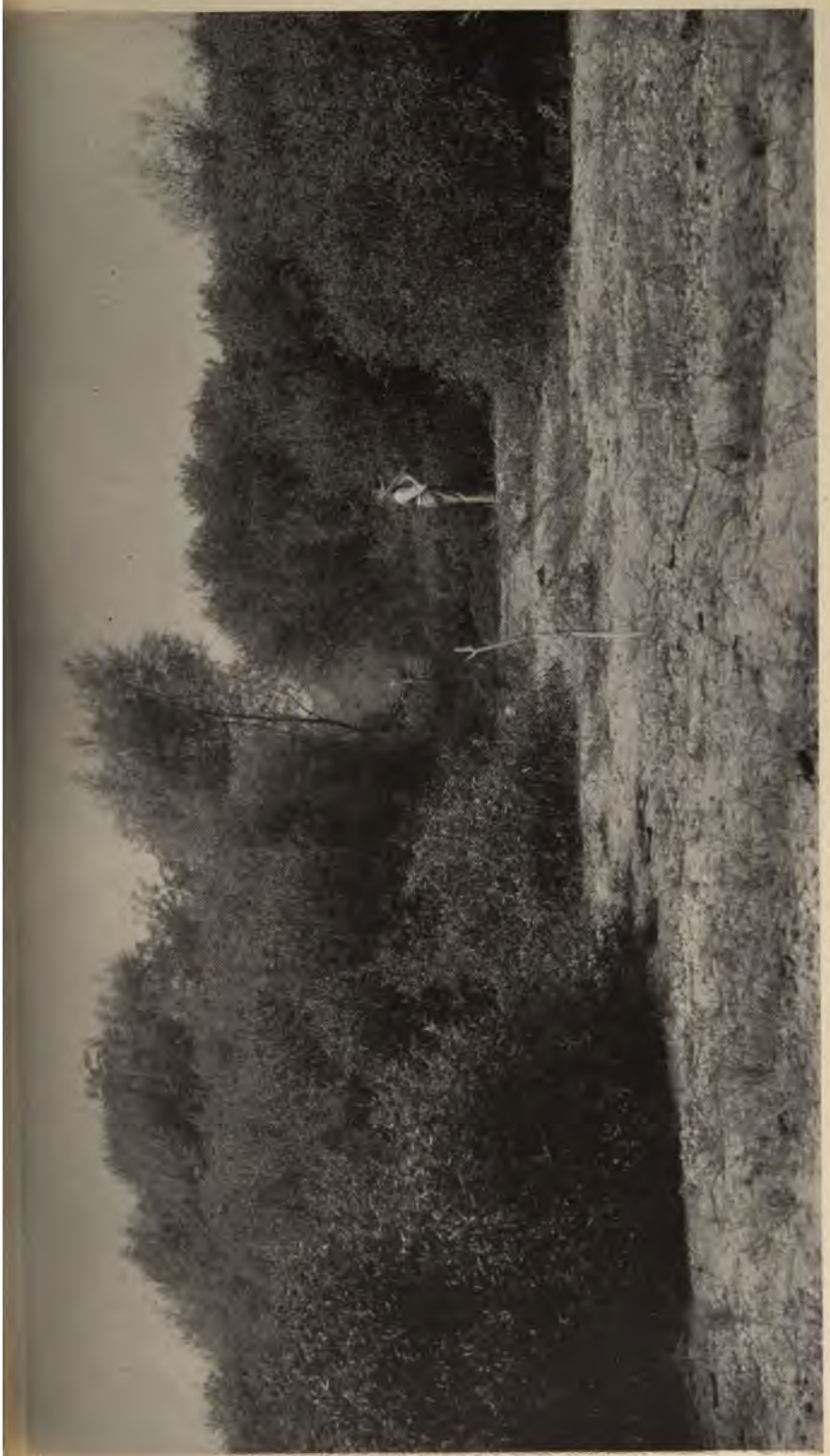




BANK BUILDING.



SHOP GROUP IN BACKGROUND.



CUTTING THE BRUSH FOR SURVEY LINES, SEPTEMBER 20, 1917.

illustration, p. 313]; that is a year ago last September. These photographs are in chronological order and the dates will follow along consecutively.

This photograph shows one of the concrete ways built during the winter [see illustration, p. 314]. Of the 50 ways there were 10 made of concrete. This photograph is looking down at exactly the same place as the picture I showed you on way No. 1 on which the ship *Quistconck* was built, and this is where ways 1 to 10, inclusive, are located [see illustration, p. 316].

The CHAIRMAN. You might explain in a general way the extent of the water and sewerage system there.

Mr. BRUSH. It is too long a story to take your time, but our sewerage system was a tremendous job. [See illustration, p. 319.] We had to drain the whole island and a territory near the island, which was three times the area of the island itself. We had to construct on the island not only a modern sewerage system, but a modern system for treating our sewage before it discharges into the Delaware River. We take our water for drinking and other purposes out of the Delaware River a short distance below where the untreated sewage from the city of Philadelphia is discharged into the river; purify it through a modern, large-capacity, quick-purification system and notwithstanding the condition of the water when we take it out of the river, the health authorities of the State of Pennsylvania require us to treat our sewage before it goes back into the river, for which purpose we have a modern plant, which pumps all sewage into two large Imhoff tanks, where the solid matter is removed and spread out on drying beds to dry and later on is hauled away, and the liquid flows through a modern self-operating chlorinating plant and then into the river. It is a common expression on the island that we put the water back into the river in better condition than it was when we pumped it out. We have not had a single epidemic or serious sickness of malaria, typhoid, or any water-borne disease or anything of that kind since they started the plant.

The photograph I now show you [see illustration, p. 324] gives you some conception of how they worked down there a year ago. This shows the dredges working. [See illustration, p. 321.] On the 20th day of September, 1917, they were making their first survey and cutting the brush you see there [see illustration, p. 313] and laid the keel for the first ship on the 12th of February, 1918. I do not care what the work or circumstances were, they performed a miracle, no matter how they did it, to accomplish it.

This is an airplane view [see illustration, p. 326] east from the main wharf on January 25 a year ago—that is, a year ago last week. This is a year ago to-day, January 30, 1918 [see illustration, p. 327], we then had this condition of ice and snow and low temperature. To date we have delivered 5 ships of the 14 launched. You could not do it for nothing.

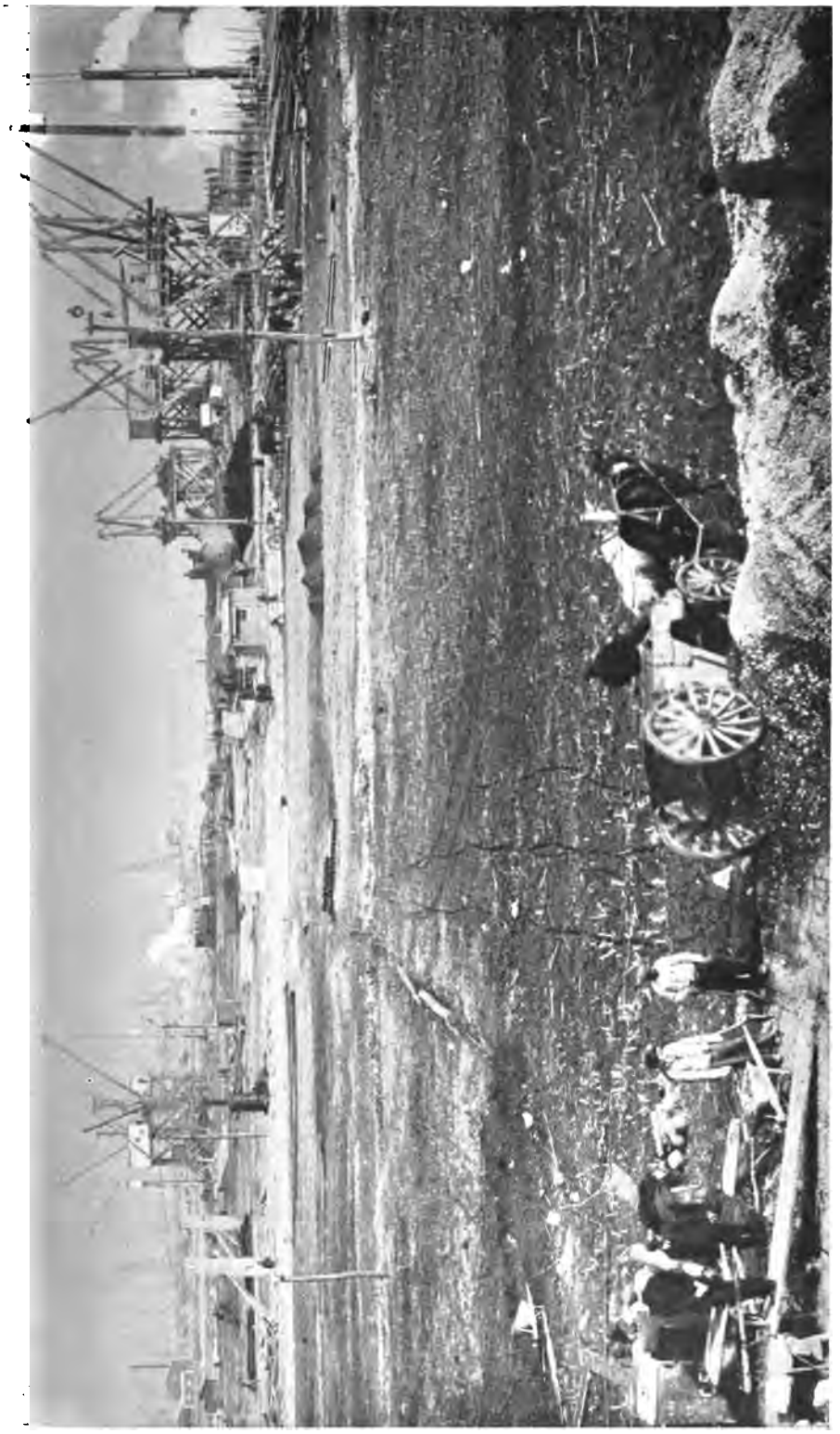
Senator VARDAMAN. You have not, either.

Mr. BRUSH. You bet we have not.

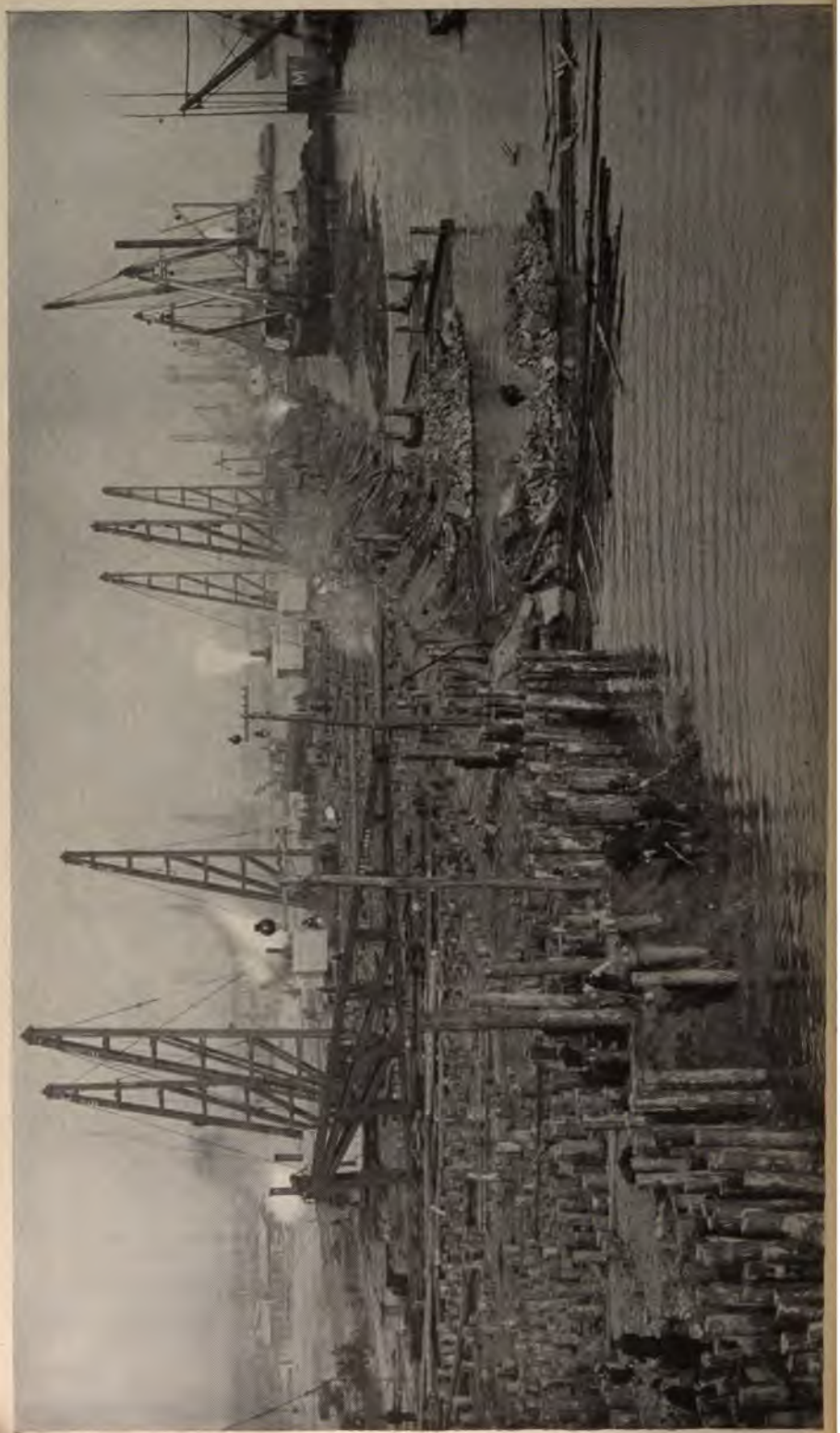
Senator JONES. But you do not say you could not have done it somewhere else?

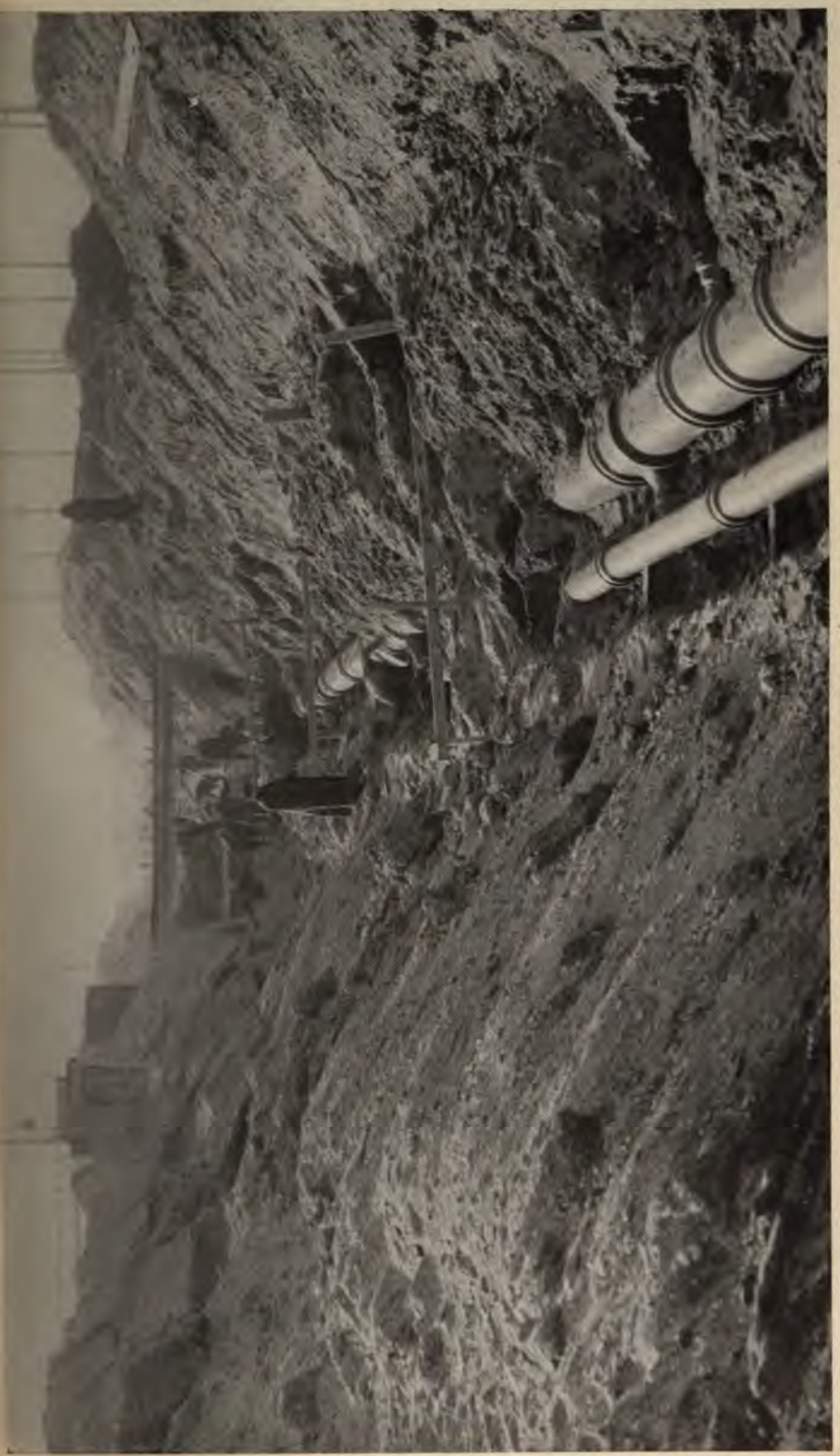
Mr. BRUSH. You mean, have built the same yard somewhere else?

Senator JONES. No; I mean delivered more ships by having the yards located at different places.

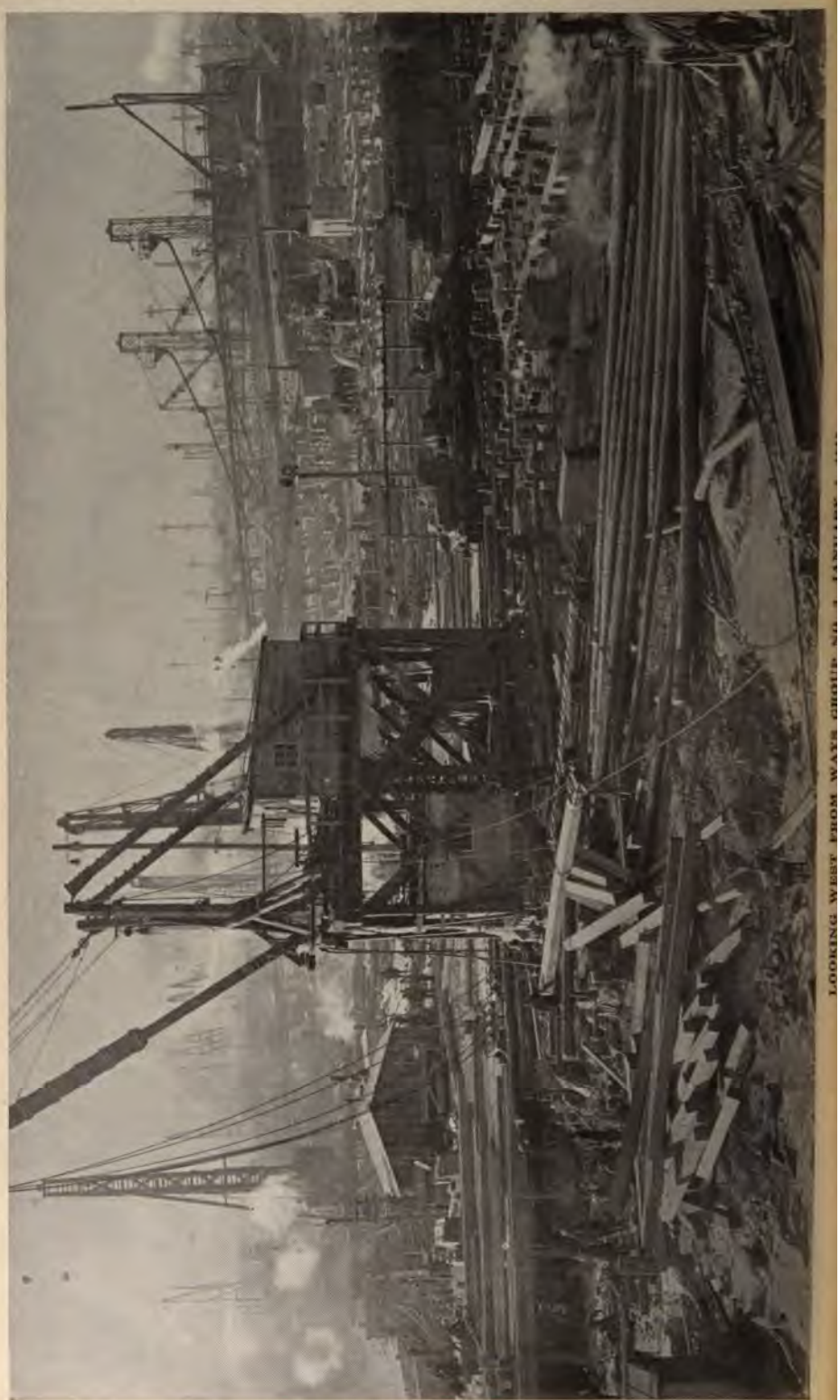


WAYS GROUPS NOS. 3 AND 4, LOOKING EAST, DECEMBER 2, 1917.





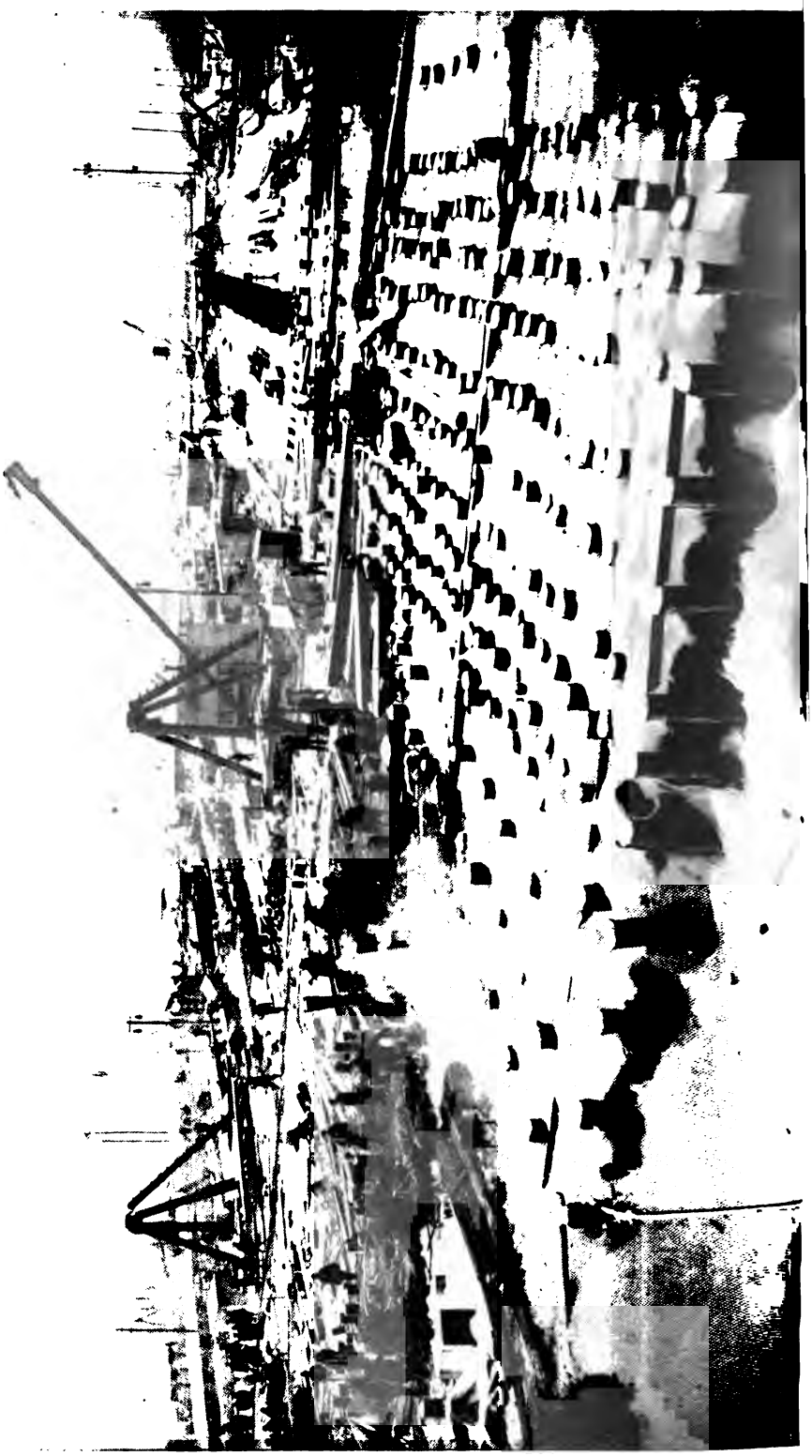
MAIN WATER AND SEWERAGE TRENCH DECEMBER 22, 1917.



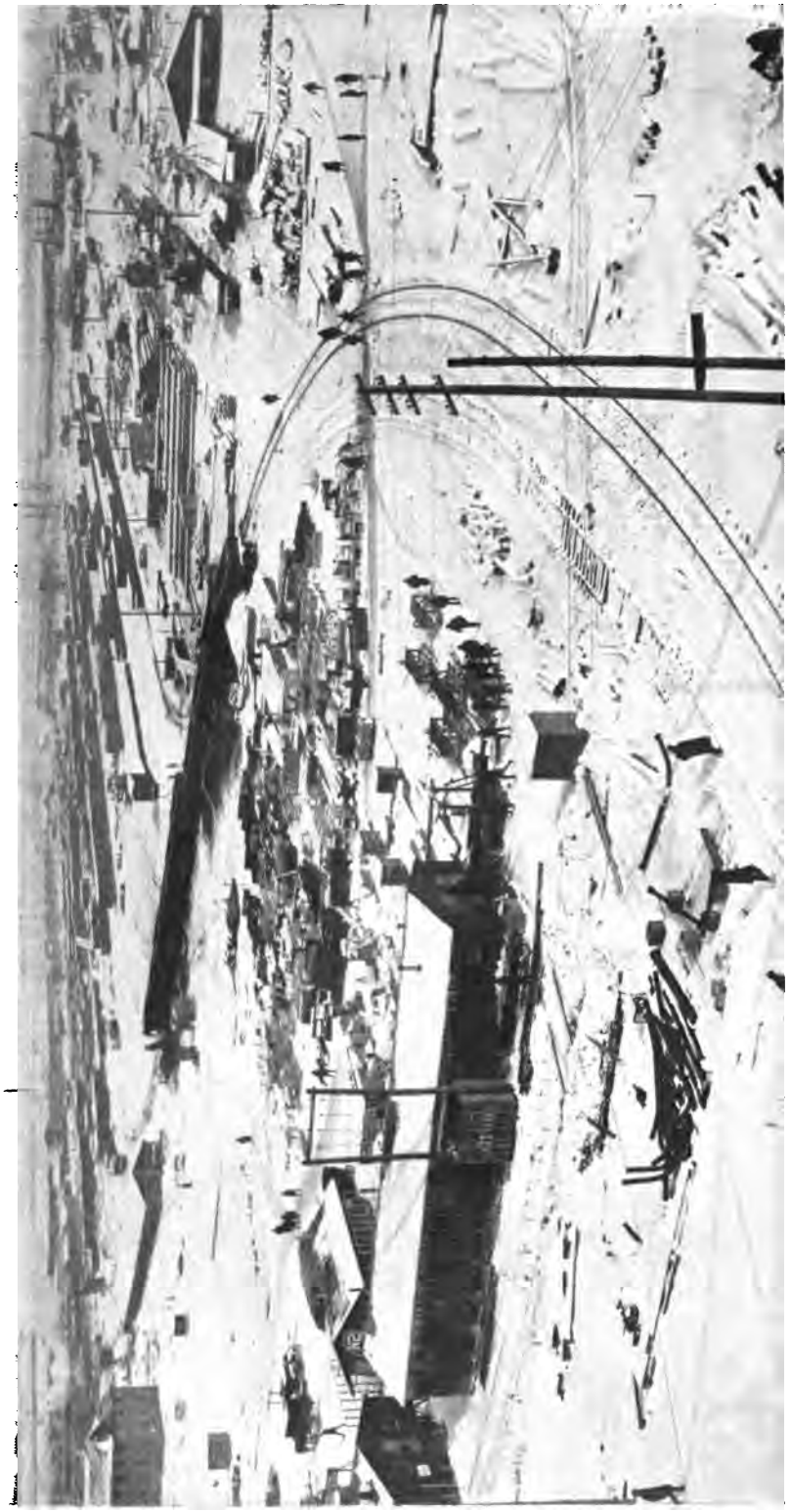
LOOKING WEST FROM WAYS ORDER NO. 1, HARRISON, N. J.

WET BASIN SECTION—DREDGING UNDER DIFFICULTIES IN ARCTIC WEATHER, JANUARY 5, 1918.

NOONTIME SCENE AT TEMPORARY MESS HALL NO. 1, JANUARY 17, 1918.



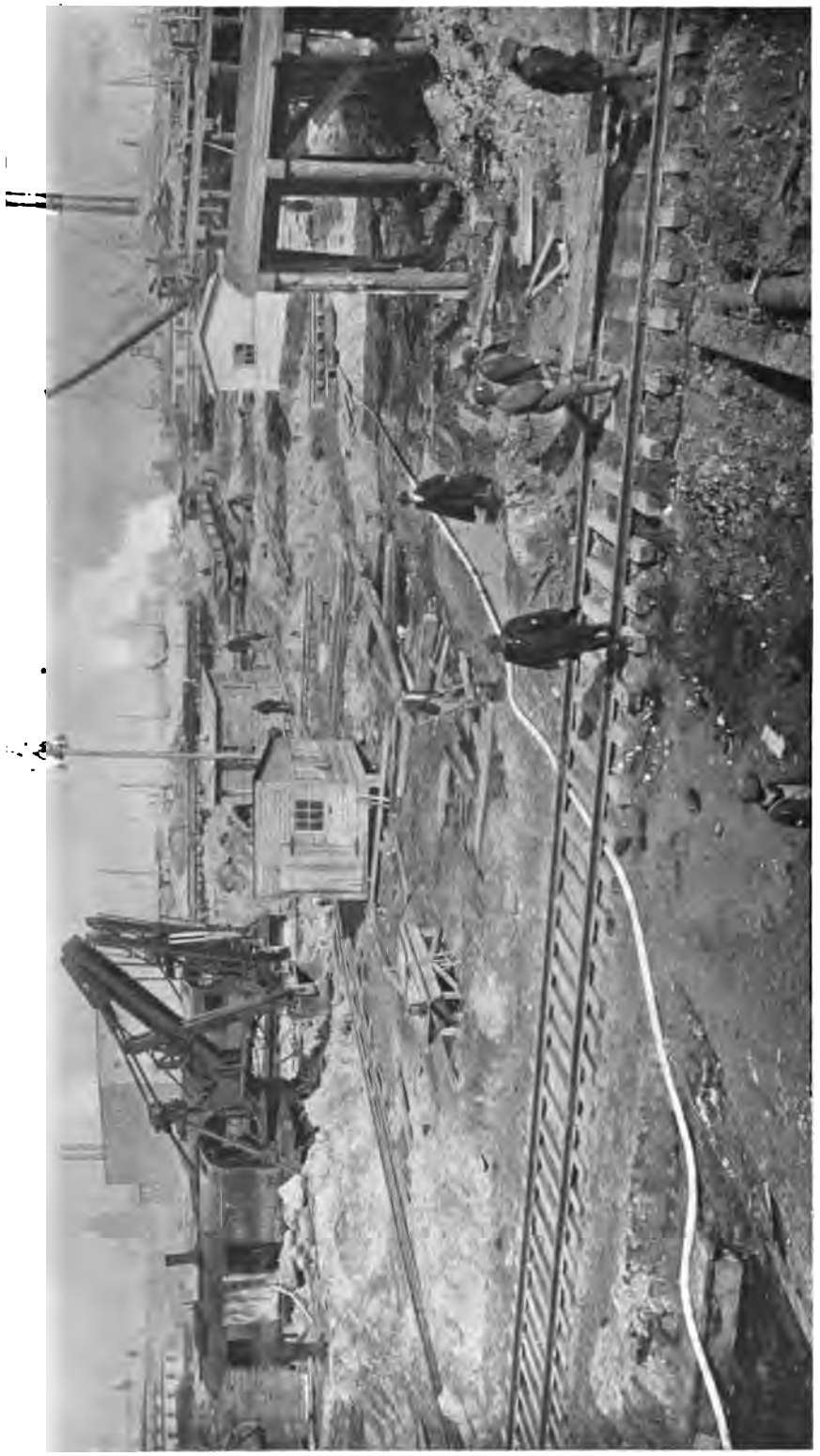
COMPRESSOR HOUSE NO. 1 AND WAYS GROUP NO. 1 (LOOKING SOUTH FROM SECOND AND E STREETS), JANUARY 23, 1918.



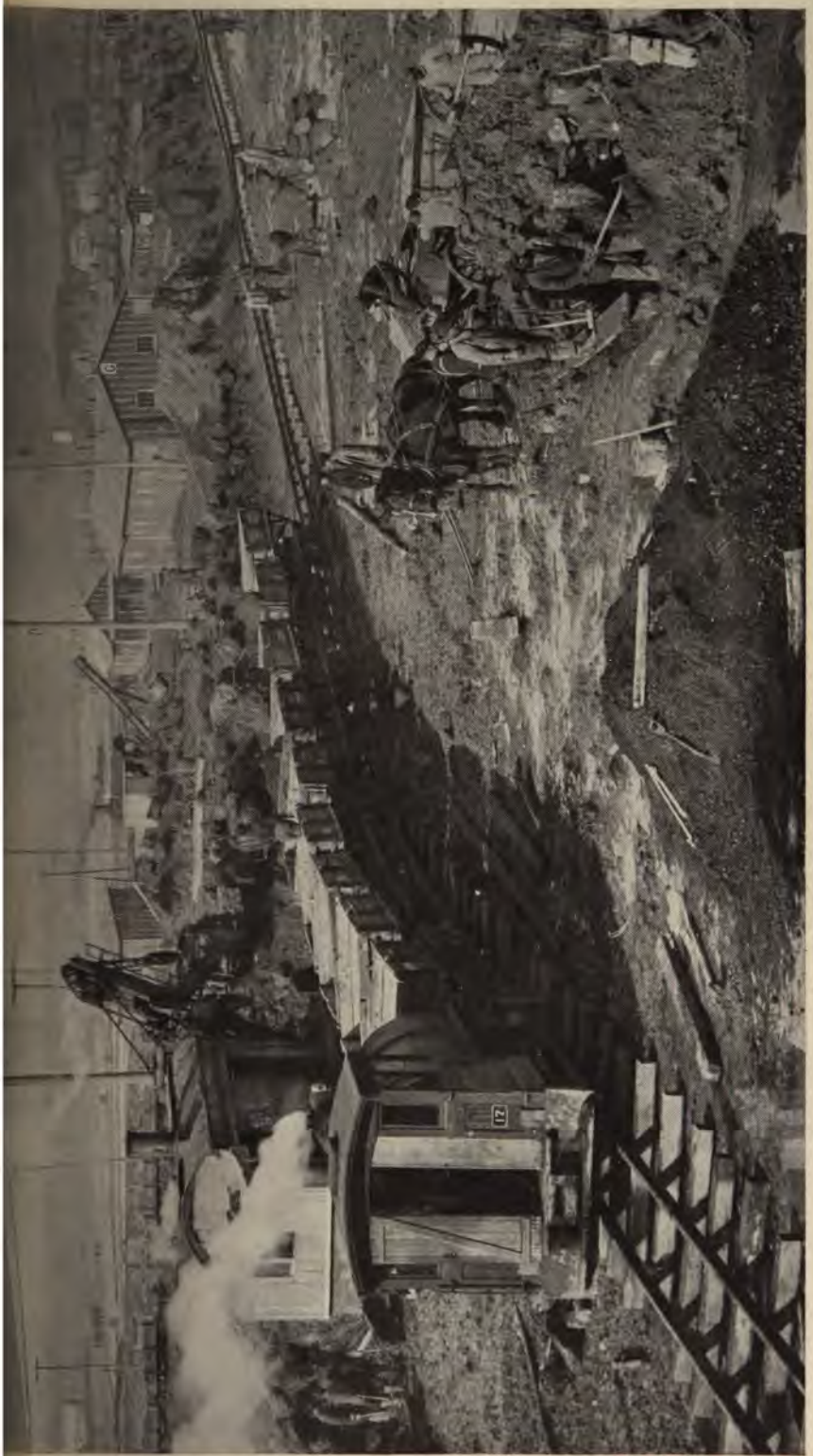
LOOKING NORTHEAST FROM CENTRAL FIRE STATION, JANUARY 30, 1918.

STEAM SHOVELS GRADING FRONT STREET, FEBRUARY 2, 1918.

TYPICAL STEEL CAISSON DRIVEN AT TOE OF SHIPWAY NO. 41, FEBRUARY 7, 1918.

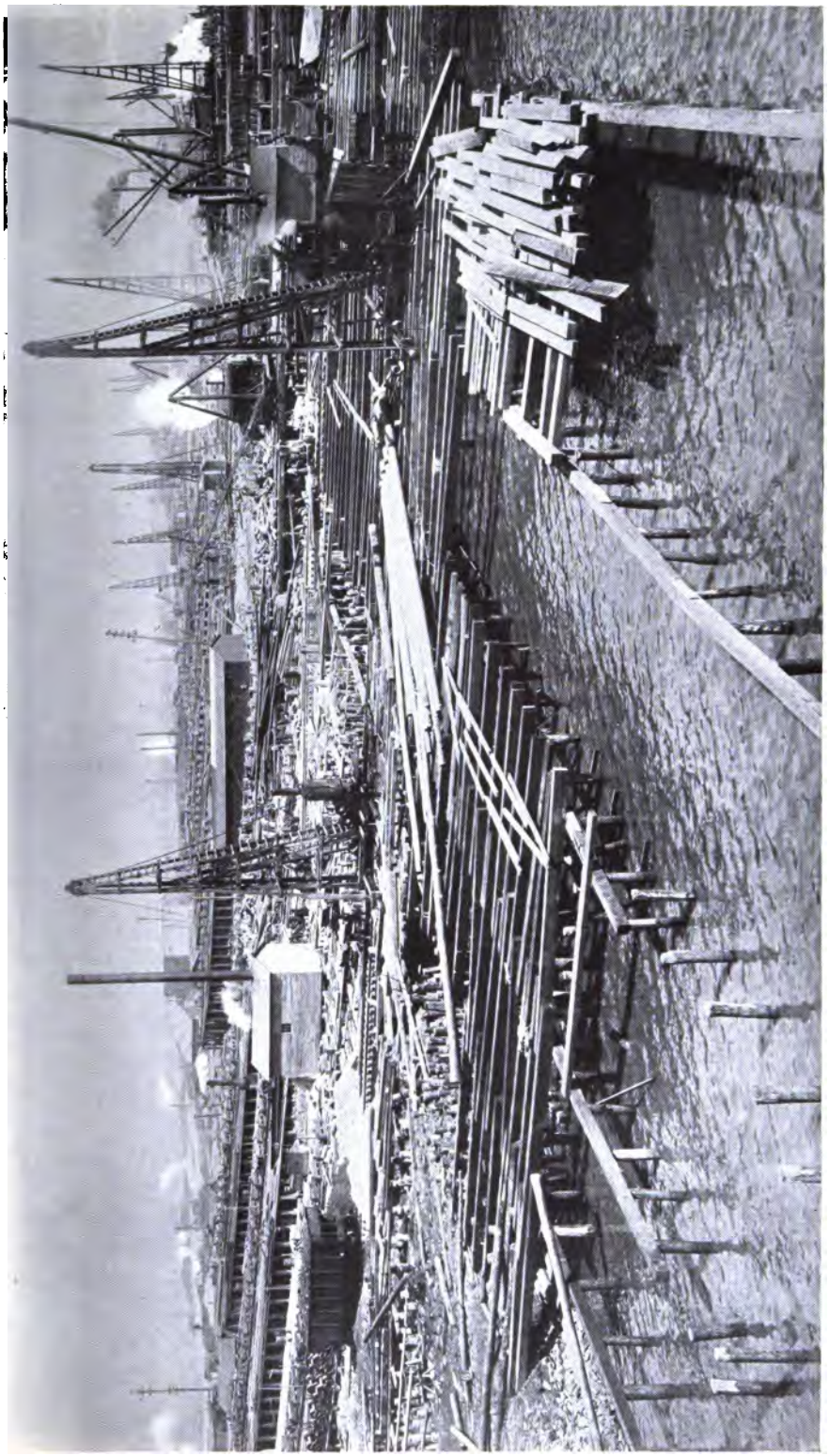


EXCAVATING TO GRADE, IN FRONT OF WAYS GROUP NO. 1, FEBRUARY 12, 1918.



EXCAVATING TO GRADE, STORAGE YARD "B," FEBRUARY 13, 1918.

DYNAMITE STORAGE (USED IN EXCAVATION WORK), FEBRUARY 23, 1918.



LOOKING NORTHEAST FROM WAYS GROUP NO. 4, MARCH 11, 1918.

Senator RANSDELL. Is that your method of thawing the ground [referring to photograph; see illustration, p. 328]?

Mr. BRUSH. Yes, sir. That is the live steam method of thawing the ground before excavating. The ground was frozen. Whether the location was right or whether the scheme was right I hold no brief, and I was not concerned with it in any way, shape, or manner; but I do think the boys really accomplished a superhuman task, no matter what the circumstances were nor what they paid, or what it cost—it was a whale of a job. I had no conception of this myself. I never saw this plant until last July.

Senator VARDAMAN. Let me ask you just at this point, is the plant complete at present?

Mr. BRUSH. Substantially so, Senator.

Senator VARDAMAN. What has it cost?

Mr. BRUSH. We have furnished Mr. Piez with a statement which shows the plant stands, with the work completed, that the Emergency Fleet Corporation have authorized us to complete prior to January 1, 1919, at $66,200,000.

Senator VARDAMAN. It has gone up $3,000,000 since I heard the last estimate, which was $63,000,000.

Mr. BRUSH. I think the figure Mr. Piez gave was the actual expenditures.

Senator VARDAMAN. When I heard him last he had estimated they had expended $57,000,000 or $58,000,000, and estimated it would take $5,000,000 more, making $63,000,000.

Mr. BRUSH. That was the figure which Mr. Piez had before him. I have checked up against the approvals of the Fleet Corporation, and have found out that each individual purchase; each individual order; each individual pay roll; each individual voucher, and each individual check is signed in longhand by the Emergency Fleet Corporation representative, and each individual blue print from the beginning up to the last one—which I have here—is signed in longhand by the authorized representative of the Emergency Fleet Corporation.

Senator RANSDELL. That part of your story you had prepared to date?

Mr. BRUSH. Yes, sir. I have it ready, Senator. Perhaps I have taken too much time in this sort of thing, but I was in hopes I could make it clear to you. May I simply show you one exhibit which is too small to have you see from a distance. [See illustration, p. 342.] The heavy black line indicates the temperature of a year ago and the broken line here indicates the temperature of this year. The light black line indicates the average temperature for the years 1911–1917.

Senator RANSDELL. I do not quite understand that.

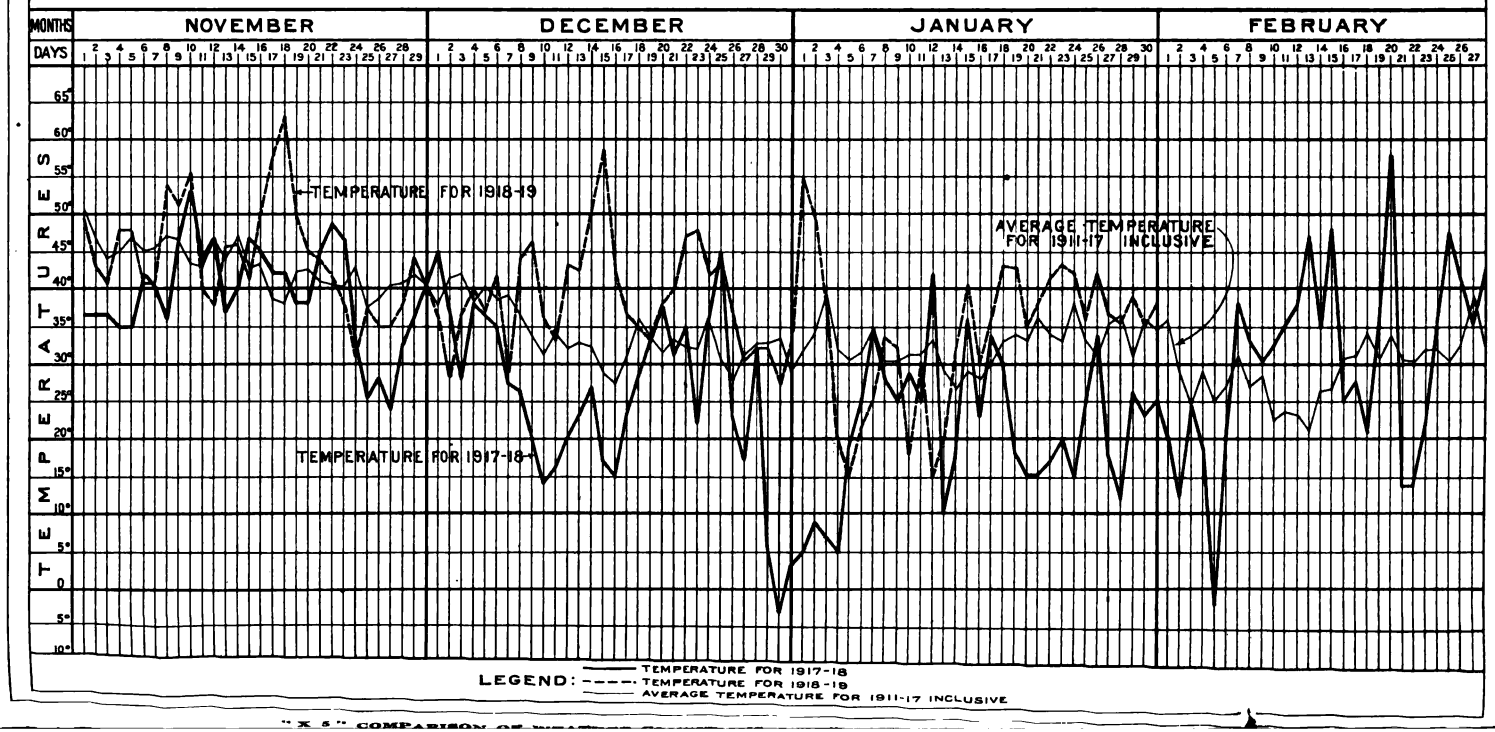
Mr. BRUSH. For instance, a year ago, on December 30, the temperature at Hog Island was about 4° below zero. On practically the same date this year the temperature was 55° above zero. The heavy black line indicates the temperature of a year ago, showing the conditions under which these people were working being the temperature of the winter of 1917–18.

Senator RANSDELL. Stating it in language so we can get it in the record, the temperature is very much higher this year than it was last year?

Mr. BRUSH. Oh, yes; there is scarcely an instance, so far—well, there was not one case from the 1st of November until the 28th of January, with the exception of five instances of short duration,

WEATHER REPORT

SHOWING COMPARISON OF TEMPERATURES FOR
NOVEMBER, DECEMBER, JANUARY, FEBRUARY 1917-18 AND 1918-19 AND
AVERAGE TEMPERATURES FOR SAME MONTHS FOR 7 PRECEDING YEARS
TAKEN AT 8 A.M.
AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION
HOG ISLAND PENNA.



"X 5" COMPARISON OF WEATHER CONDITIONS

where the temperature was below 30° this year at Hog Island, and only two instances of a few hours' duration where the temperature was as low as 15° above zero, and a year ago there were nine cases during the same period where the temperature was anywhere from 15° above to 3° below zero. The average temperature, I have not the exact figure to show, but the average temperature was very much lower a year ago than it has been up to this time, and we have had absolutely no snow on the ground at Hog Island so far this year, while last year we had great quantities.

As to the magnitude of the plant, etc., I should like to submit the following for the record.

(The statement referred to is here printed in full, as follows:)

JANUARY 28, 1919.

W-3.

MAGNITUDE OF THE PLANT.

Area, original, 846 acres.

Purchase price, $1,706,000.

Additions, in 1918, 81.14 acres. (What is known as west impounding basin was acquired at west end of original property on water front for the purpose of pumping from dredging in wet basin. Price, $200 per acre, plus fees to State, legal services, etc., making total purchase price $34,847.15. Average cost per acre, $429.47. This property was practically submerged at high tide.) Added to the 846 original, makes a total of 927.14 acres.

Dimensions of shipways:

	Square feet.
Group No. 1 (wood), 68 by 487 feet over all; total area of surface of ways	281,240
Group No. 2 (concrete and wood):	
Wood construction, 68 by 181 feet over all; area 86,360	
Concrete construction, 68 by 306 feet over all; area 208,080	
Total area surface of ways	294,440
Groups Nos. 3, 4, and 5 (wood), 68 by 540 feet over all; area	953,880
Total area of 50 ways	1,529,560

Piers between ways, 37 feet wide and vary in length from 132 feet to 324 feet.

Wide piers between each group of 10 ways are 142 feet wide.

Total area of way piers, 442,193 square feet.

Wet-basin piers: Seven piers 100 feet wide and 1,000 feet long on short side of pier.

Area of Pier M is 56,179 square feet.

Area of marginal wharf is 94,886 square feet.

Area of seven outfitting piers is 747,271 square feet.

Total area outfitting piers: Pier M and marginal wharf, 898,336 square feet.

Square feet floor area of buildings:

	Square feet.
Administration buildings, office buildings on ways and elsewhere	1,200,000
Utility buildings, fire houses, electric sub-stations, guardhouses, water stations, etc.	150,000
All warehouses	1,850,000
Shops	800,000
Hotels, cafeterias, mess halls, and sleeping quarters	505,000
Total (equivalent to 103 acres of floor space)	4,505,000

(NOTE.—Of the total 4,505,000 square feet of floor space of all buildings, 1,082,600 square feet, or 24 per cent, is fireproof or permanent buildings.)

Storage yards:

	Square feet.
Steel storage yards (90 acres)	3,915,000
Equipment storage yards (58 acres)	2,525,000
Coal-storage yards (5 acres)	240,000
Total area storage yards (153 acres)	6,680,000

	Miles.
Railroad track	82
Fence:	
Board fence	4.5
Wire fence	7.1
Total	11.6
Roads:	
Slag road	5
Plank road	16
Total	21
Sidewalks	2

ADDITION TO SCOPE.

It was impossible to determine the scope of the Hog Island shipyard until the yard was practically completed. A great many factors have contributed to enlarging the scope of certain fundamental facilities. As an illustration—wet basin piers and dredging. Estimate November 27, 1917, provided seven piers 66 by 1,000 feet, two tracks, and shallow dredging. Revision of estimate April 1, 1918, provided seven piers 100 by 1,000 feet, four standard railroad tracks, and two gantry-crane tracks for each pier, and piers strengthened for heavy gantry-crane equipment.

There are many instances where, as the work progressed and the requirements of the project came to be better realized, it was found that some changes should be made in the original plans and many additions provided, thereby adding to the total cost of the work.

I am advised at the time of the original discussion between Gen. Goethals and the officers of our company, there never had been conceived or put into execution a plan for the fabrication of ships on the enormous scale suggested for Hog Island.

As to our utilities—electric, water, sewerage and drainage, compressed air, fuel oil, heating, fire sprinkler and hydraulic systems—I should like to submit the following for the record:

JANUARY 26, 1919.

W–6.

UTILITIES.

ELECTRIC SYSTEM.

Power purchased from Philadelphia Electric Co.

Transmission lines, double-circuit steel tower, 66,000 voltage; length, 7,800 feet.

Main substation, brick and steel construction, placed in service March, 1918; capacity, 24,000 kilowatts.

Substations, 35.

Motors, 1,149; combined horsepower, 37,100.

Transformers, 577; capacity, 22,252 kilowatts.

Street and yard lamps, 3,441; equivalent in capacity to 66,620 40 watts, commonly used in residence lighting.

Building lamps, 200,000 outlets.

Electric fans, 1,558.

Pumping stations, 10.

Compressor houses, 7.

Fire-alarm boxes, 409.

Consumption, 130,000 kilowatt-hours received, transformed, and distributed.

Time clocks, 422, synchronized with and operated by master clock located at main substation.

Electric yard call, 28 stations.

Miscellaneous, electric tabulating machines for material control and financial accounts. Electric-driven potato peelers, dough mixers, dishwashers, and hospital appliances.

STATISTICS—ELECTRICAL.

Overhead wires, 400,000 feet, equal to more than 75 miles.
Poles for overhead lines, 500.
Underground cables, 400,000 feet, over 75 miles.
Fiber duct laid in concrete, 237,600 feet, 45 miles.
Wire used in lighting permanent buildings, 2,000,000 feet, approximately 379 miles.
Temporary work—
Overhead wires strung, 531,000 feet, 101 miles.
Poles set, 1,052.
Substations built, 3.

HISTORICAL.

During September and October, 1917, engineers, spurred by demand for speed, drew plans and specifications and ordered equipment for an electrical receiving and distributing system totalling 24,000 kilowatts. Work normally completed in weeks, completed in hours. Decisions usually requiring days made in minutes.

Electric power first delivered October 22, 1917. Transformers for the first temporary substation brought in by wagons over roads hub deep in mud, each wagon requiring 12 horses.

A plant the size of the one at Hog Island would supply a city of more than 200,000 population and would be capitalized at approximately $4,000,000.

WATER SYSTEMS.

Kind—
1. High-pressure system for fire protection and industrial use.
2. Domestic system for drinking water, etc.

High-pressure system.

Number of pumping stations, 2.
Capacity, 19,000 gallons per minute.
Source of supply, Delaware River.
Pressure, normal, 62½ pounds; fire, 125 pounds (with pumps connected in series).
Pipe, 86,000 feet (16.3 miles); size, 2 inches to 16 inches.
Fire hydrants, 270.

Domestic system.

Number of pumping stations, 1.
Filtration plants, 1.
Capacity, 2,000,000 gallons per 24 hours.
Source, Delaware River.
Character of filtration, rapid sand gravity filter, through which water is sedimented, filtered, and chlorinated.
Pipe, 69,860 feet (13.2 miles); size, 2 inches to 16 inches.
Storage capacity, 330,000 gallons.
Consumption, average per day 1,800,000 gallons, 54,000,000 per month.

High-pressure and domestic systems combined.

Pumping stations, 3.
Total water pipe, 156,583 feet (29.65 miles).
Consumption (estimated), 2,800,000 gallons per day, 84,000,000 gallons per month.
Hydrants, fire and flush type, 331 (living quarters fire hydrants on domestic supply).
A plant of this size would supply a city of 30,000.

SEWERAGE AND DRAINAGE.

Sewage-disposal plants, 1 (2 pumping plants).
Drainage system, 2 pumping plants (surface draining).

Sludge drying beds, 2.
Disinfecting house, 1.
Sewers and drains, 140,635 feet (26.6 miles).
The sewerage system would take care of a municipality of 30,000 people.

COMPRESSED-AIR SYSTEM.

Compressor houses, 7.
Equipment, 19 cross compound compressor units direct connected to high voltage synchronous electric motors; ten, 5,320 feet capacity, driven by 1,0 horsepower motors; nine, 2,275 feet capacity, driven by 450-horsepower moto
Capacity load, 73,675 cubic feet of air per minute, requiring 14,250 horsepow
Daily consumption, 26,500,000 cubic feet of free air.
Pressure, 100 pounds per square inch cooled after compression to 10° abo cooling-water temperature.
Pipe, 90,000 feet, 17 miles, of steel pipe used for distributing.
Size, third largest plant in the world. Largest plant at Rand Mines, Sout Africa. Largest in America at Butte, Mont.

FUEL OIL SYSTEM.

Use, shop furnaces and Gantry locomotive cranes.
Storage tanks, 2, capacity 200,000 gallons.
Pipe, 16,000 feet, 3 miles.
Delivery, either by barge or steel tank cars. (Oil for ships delivered by barge, not through this oil system.)
Pumping stations, 2.

HEATING SYSTEM.

Plants, 51.
Boilers, 82; 26 of 150 horsepower, 10 of 20 horsepower, and 46 low pressure. Steam is also used for cooking and laundry purposes and industrial purposes in shops.
Pumps—Boiler feed, 10; vacuum, 74.
Radiators, 1,600.
Radiation, 326,916 square feet.
Coal consumption, 244 tons per day, average.

FIRE SPRINKLER SYSTEM.

Number of heads, 7,199.
Piping, 54,401 feet, 10.3 miles.

HYDRAULIC SYSTEM.

Number of stations, 1.
Accumulator, 1.
Storage tank, 1.
Pumps, 3.
Motors, 3.
Hydraulic presses, 13.

HISTORICAL—ALL UTILITIES.

The work of constructing the various utilities was carried on under the greatest imaginable handicaps, both as to isolation of location from transportation, water supply, bad drainage, weather conditions, labor conditions, and other causes coincident with the construction of the shipyard being carried on at one and the same time. During the winter months ground was frozen to a depth of 2 feet, considerable portion of the excavation requiring blasting.

Senator NELSON. Mr. Chairman, I suggest that the committee take a recess until 2 o'clock.

The CHAIRMAN. Very well.

(Whereupon a recess was taken until 2 o'clock p. m.)

AFTER RECESS.

At 2 o'clock p. m. the committee reassembled pursuant to the taking of recess.

The CHAIRMAN. Let us proceed, Mr. Brush.

Mr. BRUSH. Mr. Chairman and gentlemen, I think it would be proper and in form at this time to make clear one point which ap-

parently I did not make clear this morning. Some of the gentlemen have called my attention to it during the luncheon hour. That is in connection with the reason for the *Quistconck* not having the highest Lloyd's rating, and I am afraid I left the wrong impression in the way I answered Senator Lenroot's questions. I think we ought to understand that up to comparatively a short time ago British Lloyd's was practically the only inspection bureau, and all marine insurance companies required a Lloyd's certificate before they would insure a vessel. That made necessary the inspection of all ships by Lloyd's inspector. Now, Lloyd's is a British institution, and this country undertook to establish a similar inspection bureau, called the "American Bureau of Shipping" under the direction of Commander Stevenson Taylor. When the Emergency Fleet Corporation let the contracts for these ships, they recognized that in order to make it perfectly clear that the American bureau, which was an American institution and was headed by a United States Government representative, be given an opportunity to establish itself——

The CHAIRMAN. I think I might correct you here. It is not being established by the Government.

Mr. BRUSH. I do not mean by the Government.

The CHAIRMAN. The Shipping Board may be encouraging it as an American enterprise.

Mr. BRUSH. That is what I meant to say. So the first 50 A ships at Hog Island were inspected by Lloyd's and by the American Bureau both. They have on the side of the vessel, however, "A. B." and not "L. R.," A. B. meaning American Bureau and L. R. meaning Lloyd's Register. The second set of A boats, the 60 A boats, Lloyd's will not examine; they will be examined by the American Bureau only. At the time of the purchase of these chains for these ships they were purchased by the Emergency Fleet Corporation and not by ourselves, and they saw fit to use the American Bureau as their inspector out in these factories where this material was manufactured.

Senator VARDAMAN. Is this American Bureau a private enterprise or is it under Government regulation?

Mr. BRUSH. The American Bureau is a private corporation collecting a regular charge or fee for their services, which is applied, however, to offset its running expenses and for carrying on its business. It has no stock and pays no dividends. I understand that a number of leading Government officials, such as the Chief Constructor and the Engineer in Chief of the United States Navy, are chairmen of technical committees of the bureau.

Senator VARDAMAN. Who is at the head of it?

Mr. BRUSH. Commander Stevenson Taylor—so that on the second 60 A's we have no inspection by Lloyd's at all. When these chains came to us they had received the A. B. inspection and certification. Mr. Levy tells me that he understands that the American Bureau is for the information of the marine underwriters in this country.

Senator RANSDELL. Have you any objection to allow Mr. Levy to tell us just a little about that?

Mr. BRUSH. No, sir. Mr. Levy, so it may be clear in your record, was formerly General Manager of the Frisco lines and is now my assistant at Hog Island. He represented the Emergency Fleet Corporation for about four months at the island and for several months

past has been assistant to the president of the American International Shipbuilding Corporation.

Mr. LEVY. All I can say is that the American Bureau is a private organization run for the information of the marine underwriters, shipbuilders, and shippers of America.

The CHAIRMAN. Insurance is based on their classification?

Mr. LEVY. In a similar manner to the insurance of British vessels in Lloyd's.

Senator RANSDELL. And the French Bureau Veritas?

Mr. LEVY. Yes, sir.

Senator RANSDELL. It is a classification society for American ships, so that the underwriters in insuring them may know they are properly classified, just exactly as Lloyd's serves the British ships?

Mr. LEVY. It is to America what Lloyd's is to England.

Mr. BRUSH. The reason that matter should be made clear is that these chains on the *Quistconck* are good chains. I know that from personal information, because I have seen them submitted to as severe a test as you can possibly submit a chain, and I have the evidence of Capt. Carlton, of the United States Navy, who stated to Admiral Bowles and Mr. Piez in my presence that he considered the steering gear on these ships and the anchor handling arrangement the finest he had ever seen on any vessel on which he ever sailed. The American Bureau was satisfied with these chains. Lloyd's had not been consulted in their inspection at the point of manufacture. Therefore when these chains were put on board the ship Lloyd's would not pass them. The American Bureau did pass them, and she has the highest rating the American Bureau gives any cargo ship.

Senator RANSDELL. And it was solely because of some apparent slight defect in the chains that Lloyd's did not rate the *Quistconck* first class?

Mr. BRUSH. That is what Lloyd's stated, Senator. Some of the links in each of these chains instead of being absolutely straight are slightly warped and the welds of a slightly smaller diameter. As far as tensile strength is concerned it has just as much strength as a link each side of which is the same, but they did not look just alike on each side and Lloyd's had nothing to do with them until they were placed on the ship. Instead of the *Quistconck* having Lloyd's rating of +100A—1, it has the rating of +100A— the figure "1" representing equipment being left off. That is all the difference.

Senator RANSDELL. There is only a slight defect, according to Lloyd's?

Mr. BRUSH. Yes, Senator.

I should like to call your attention to Article I of the constitution and by-laws of the American Bureau of Shipping, which was inserted in your record of proceedings last March (p. 2391) when Commander Stevenson Taylor appeared before you. The article is as follows:

ARTICLE I. *The objects of the bureau.*—The objects of the bureau are as shown by the charter, and for the purpose of carrying out these objects the bureau is to provide for shipbuilders, underwriters, shippers, and all interested in maritime commerce a faithful and accurate classification and registry of mercantile shipping and to aid and develop the merchant marine of the United States of America.

Senator RANSDELL. May I ask you about the class B ships? Who is going to classify them? Lloyd's or the American Bureau?

Mr. BRUSH. The American Bureau and Lloyd's will classify the first 50 A ships and the 70 B ships and the American Bureau only will classify the 60 A ships.

As an evidence of what we are endeavoring to do at Hog Island with respect to creating a team, which must be the secret of our success, if we are to have a success—and I feel confident that we are—immediately on my taking charge I called together 27 heads of the different divisions and departments so that all might understand each other, and we agreed upon a policy. We have a meeting once a week of these heads of departments and heads of divisions in order that we can eliminate unnecessary duplication. It is purely to determine the method of organization to follow, the same method of organization that I have followed with all companies with which I have been associated in the past, and I think this expresses it better than anything I could say. These minutes of our meetings are the minutes as we went along day after day, one a week at least, and we agreed this should be the policy of our so-called council. I call it a "council" intentionally, because I think these men should feel we are all on an equal basis in the council rather than a chief with a lot of subordinates, and the caliber of men you have at Hog Island in the executive force is as fine and as high grade as I have ever found.

I have not brought anybody to Hog Island. Mr. W. B. Ferguson, a graduate of the Naval Academy, was there when I went there, Capt. C. S. Bookwalter, a graduate of the Naval Academy, was there when I went there, and the men in charge of the different divisions I found when I went to Hog Island. They were men who had given up positions which they held elsewhere, or interests in concerns, and they have agreed that they will stay on with me and complete the job. I have in mind a man who was vice president and a very substantial owner in a steel concern who probably, from a selfish standpoint, would be better off at home.

Senator VARDAMAN. How are those men paid?

Mr. BRUSH. By us as the agents of the Emergency Fleet Corporation. The policy which we agreed we would follow when I formed the council is this:

> After the freest and most frank discussion, with opportunity for each and every man directly or indirectly concerned to express his opinion or judgment on any matter or policy or detail of operation or construction, the decision must be rendered by the responsible executive head, and this decision having once been determined upon, the officers and any others concerned shall loyally carry it out, even though it be against their own judgment, until conditions to their knowledge have in any way, shape, or manner changed which, in their judgment, may possibly change the executive's decision, at which time it shall not only be their privilege but their duty to again open up the question.

The result is that we get expressions of opinion from the men all the way down the line. We have meetings there from our heads of divisions down. I attended a meeting the other night of 60 of the instructors, who instruct the new men in the training school. We have meetings of our foremen, at which free discussion of methods of work is carried on, and I feel very confident there is going to be created and is in process of creation now a very remarkable team; as fine a team as you have ever seen. I think I have never seen men spend their time, energy, and ability more freely, and they are

staying through with the game. I know absolutely whereof I speak they can not be beaten. I have not a single word of fault to find.

On October 29, 1918, there were in the employ of the compan 28,573 men, and on January 28, 1919, there were 34,049. This i an increase in those who were directly involved in building ships That is, your riveter, your holder-on, and your bolter-up, your fitte etc. The men on the ships and in the shops show an increase of 7,41 and the decrease in those not directly involved in building ships i 1,938. I assume it is my job to create as full and as big a force as can building ships and to make the percentage of all other employee as small as I possibly can.

The ship construction and shop employees increased from 58 pe cent to 70 per cent and others decreased from 42 per cent to 30 pe cent, which is just what I assume we ought to do. I will not take th time of the committee reading the details of this statement, but wil hand it to the stenographer and he can copy it into the record.

(The statement referred to is here printed in full as follows:)

"W–10."

COMPARISON OF MEN EMPLOYED ON SHIPWAYS AND IN WET BASIN WITH OTHE EMPLOYEES.

Comparison of the number of employees in each division, Oct. 29, 1918, and Jan. 28, 1919.

Division.	Oct. 29, 1918.	Jan. 28, 1919.	Increase.	Decrease.
Executive	77	67	.....	1
Financial	1,490	1,271	.....	21
Yard	6,377	5,029	.....	1,34
Ship construction	15,795	22,702	6,907	.....
Shops	817	1,298	481	.....
Purchase	332	324	.....	8
Steel and machinery	968	845	.....	12
Industrial relations	548	318	.....	23
Stores and material	2,169	2,195	26	.....
Total	28,573	34,049	7,414	1,93

Comparison of employees working on ship construction and in shops Oct. 29, 1918, and Jan. 28, 1919, with other employees.

Division.	Oct. 29, 1918.	Jan. 28, 1919.	Increase.	Decrease.	Per cent increase.
Ship construction	15,795	22,702	6,907	.....	4
Shops	817	1,298	481	.....	5
Total	16,612	24,000	7,388	.....	.....
Executive	77	67	.....	10	.....
Financial	1,490	1,271	.....	219	.....
Yard	6,377	5,029	.....	1,348	.....
Purchase	332	324	.....	8	.....
Steel and machinery	968	845	.....	123	.....
Industrial relations	548	318	.....	230	.....
Stores and material	2,169	2,195	26	.....	.....
Total	11,961	10,049	26	1,938	[1]16

[1] Decrease.

Ship construction and shop employees increased from 58 per cent on October 29, 1918, to 70 per cent on January 28, 1919; ratio of increase, 21 per cent. Other employees decreased from 42 per cent to 30 per cent; ratio of decrease, 28½ per cent.

Mr. BRUSH. One of the elements in which I think the committee ought to be very much interested, and one of the elements of which I think we are justifiably proud at the island, is the fact that I think we were the first institution in the United States to deliberately go out and take wounded soldiers out of the hospitals and undertake to give them positions where they could earn a living.

On Saturday night, during the last week of the fourth liberty loan campaign, I listened to a young man make an address to a crowd of people in the interest of liberty bonds, and this young man, a Mr. Owen, who was field secretary for the Four-Minute Men and Council of National Defense, had with him about 20 wounded soldiers. He presented each of these boys to the people and prevailed on a number of them to make short talks.

I got in touch with him, and by securing his leave of absence from the above-named war bodies, got him into our organization and sent him to Washington to secure the cooperation and support of the War Department in having returned wounded soldiers and marines sent to Hog Island on furlough, for their further physical development; their moral effect on our workmen, and that they might be taught new trades and occupations which would be useful to them throughout their lives in successfully competing with physically normal men.

The office of the Secretary of War indorsed our plan heartily, as also did the Surgeon General's Department of the Army and the Federal Board for Vocational Education. The Surgeon General's Department and the Federal Board each sent a representative to Hog Island to inspect the plant and our facilities for caring for and teaching these men. On November 11, 1918, the first men were furloughed to us—14 of them—from the Walter Reed Hospital, Washington, D. C. Each had lost an arm or a leg, and here is a photograph of the first 13 of these boys taken soon after their arrival at Hog Island. [See illustration, p. 352.]

We brought them down to the island the next day, and in a report which was made on December 4 there is reference to the first man. He was placed as a rivet heater at 50 cents an hour. He has since been taught to fulfill the duties of an expert signalman, which pays him 75 cents an hour. He has one arm off at the left elbow. Another one, with loss of the left arm at the shoulder, was placed as a material checker at $30 per week and is giving satisfaction in that position.

Third, a man with loss of right arm below elbow was placed as a rivet heater at 50 cents an hour and has since become a signalman at 75 cents an hour.

Fourth, the same applies to a man with loss of right arm below elbow; another one with loss of left arm above elbow was placed as a signalman and is fulfilling the duties at 75 cents an hour. The tenth was a man who had suffered the loss of his left arm above the elbow; he was placed as an electrical checker at 54 cents an hour. The next was a man who had suffered the loss of his left leg below the knee, was placed as a material checker at $30 per week, and is now chauffeur for an official, driving a large touring business car, for which he is being paid $5.50 a day. That man has a good artificial leg, and is just as good a man for his job as a man who had never gone to war. The next a man who lost his arm below the elbow, was

laced as rivet heater at 50 cents an hour, and is now a material hecker at $30 per week.

Senator VARDAMAN. These are all men, under the pay of the Gov-rnment?

Mr. BRUSH. Yes; they were at that time, and by us also, having ince been discharged from the service; but none of these men are eing treated as subjects of charity.

Senator RANSDELL. They are doing just as good work as anybody lse?

Mr. BRUSH. Yes, sir; every bit as good. For the information of he committee I wish to place in the record copy of a circular dated December 4, 1918, the subject of which is "Good Jobs for Soldiers," a supply of which was mailed to the commander of each base and camp hospital in the East with the request that the circulars be posted where they could be read by the wounded soldiers.

(The circular referred to is here printed in full as follows:)

"W-58-B."

DECEMBER 4, 1918.

GOOD JOBS FOR SOLDIERS.

The American International Shipbuilding Corporation at Hog Island, just outside of Philadelphia, Pa., offers employment to returned discharged overseas soldiers—whether partially incapacitated through having been wounded, or through the loss of part of their faculties.

Men will be given every consideration.

Where necessary, they will be taught new trades and occupations, and otherwise fitted to cope with normal men throughout life.

The minimum or lowest wage that will be paid is 46 cents per hour—44 working hours to the week.

There are now a number of returned soldiers working at Hog Island, who have lost an arm, a leg, an eye, etc. Several are making 75 cents and 80 cents an hour.

There is an Emergency Fleet Corporation hotel adjoining the shipyard—new and modern in every respect—where men may secure room and two meals (namely, breakfast and supper) for $9 per week.

Come to Philadelphia—telephone Tinicum 100, and ask for branch phone 242, labor control department.

AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION.

Senator RANSDELL. You are not giving them any preference because of being wounded soldiers?

Mr. BRUSH. No, Senator; we came to Washington and secured these men. The last man had suffered the loss of his left leg above the knee. He was placed as a steel checker at $30 per week, in which position he made good and is now ready for advancement.

Senator VARDAMAN. That really is not charity; it does not come out of the pockets of your company; it comes out of the United States Treasury.

Mr. BRUSH. What do you want me to say, Senator?

Senator VARDAMAN. Then there is no especial charity on your part, on the part of your company doing this?

Mr. BRUSH. The only thing I am proud of is that our boys there did "go to it" I believe before other plants started to help take care of these boys in an organized way to aid them to secure jobs and earn money without charity on anybody's part.

Up to the present time, January 28, we have placed 2,053 soldiers; 226 were not suited by the employment offered, and there were 64 who

were disqualified for special reasons and we have therefore given c sideration to 2,345 men in khaki. The approximate number of m discharged from the Army in that list is 1,720; from the Navy a Marine Corps 335; from overseas service 309, and the number men wounded in service is 69. Ninety-five per cent of these m are working out in the open and seem better satisfied in this capaci Numbers of them have learned new trades and occupations; in fa all the wounded men, due to being partially incapacitated, have be forced to do so. The percentage of departure is very slight. number of these men are living on the island, either in the barrac or E. F. C. Hotel.

All of these men seem to appreciate the work offered them and t opportunity given them for advancement. Their morale is go and they accept this employment in a serious, business-like manne The superintendents and foremen, generally, report their work steady and efficient. With the additional number of men being di charged now, approximately 100 men are interviewed daily, wit about 80 per cent accepting the work offered them, and I *do no* believe there is one instance where a man in the service has been flatly turned down at Hog Island when applying for work.

Senator RANSDELL. Sixty-nine of those men had been wounded?

Mr. BRUSH. Yes, sir. I should like to submit for the record at this point the following correspondence.

(The correspondence referred to is here printed in full as follows:)

"W-58."

PHILADELPHIA, PA., *December 4, 1918.*

MATTHEW C. BRUSH, ESQ.,
Vice President American International Corporation,
Philadelphia, Pa.

DEAR SIR: During the last week of the fourth liberty loan, while fulfilling my duties as field secretary for the four-minute men and the Council of National Defense, I, accompanied by 20 returned wounded American soldiers, canvassed the patrons of the Ritz-Carlton Hotel in furtherance of the bond sales. Several directors and officers of your corporation were present and, realizing the psychological effect these returned wounded soldiers would have on the workingmen of the Hog Island shipyard, I was approached with a proposition to devote my time toward securing the discharge of a number of such soldiers that they might be brought to the shipyard and put to work at various trades and occupations.

On October 23 I proceeded to Washington with Mr. E. N. Moore, of the labor control of the A. I. S. C., and, with the assistance of Mr. Pizzini, an official of the American Red Cross, we interviewed the Secretary of War's office, and particularly Mr. Stanley King, secretary to Mr. Baker, who indorsed the idea heartily and directed us to secure the indorsement of various boards and committees already interested in the returned wounded soldiers' welfare. This idea was enthusiastically received by the Federal Board for Vocational Education, the committee on development battalions, an Army organization composed of two civilians and two Army officers, the Surgeon General's department, and the American Red Cross. With these indorsements we returned to Mr. King and took the matter up personally with Mr. Baker, with the promise of furloughing the men at an early date.

Just as the order was about to be given the armistice was signed and, naturally, the War Department became overwhelmed with matters of more importance, also the psychological value to the Hog Island shipyard was enhanced.

On November 11, Col. Schreiner, commander of the Walter Reed United States Army Base Hospital, Washington, D. C., furloughed 14 soldiers to Hog Island for 30 days for work. Twelve of these men had lost an arm and two

a leg. On November 12 they were given rooms in the E. F. C. Hotel, and on the 14th were placed at work in the shipyard.

The following is a synopsis of the conduct and advancement of these particular 14 men since that date:

Pvt. Wilbert Gregory, loss of left arm above elbow. Was placed as a rivet heater at 50 cents an hour. He has since been taught to fulfill the duties of an expert signalman, which pays him 75 cents an hour.

Pvt. Howard Stevens, loss of left arm at shoulder. Was placed as a material checker at $30 per week and is giving satisfaction in the same position.

Corpl. Theodore Zechin, loss of right arm below elbow. Was placed as a rivet heater at 50 cents an hour and has since learned to become a signalman at 75 cents an hour.

Pvt. Dorsey Kelly, loss of right arm below elbow. Was placed as a rivet heater at 50 cents an hour and has since learned to become a signalman at 75 cents an hour.

Pvt. Hugh Harrell, loss of right arm below elbow. Was placed as a rivet heater at 50 cents an hour and has since learned to become a signalman at 75 cents an hour.

Pvt. William E. Leslie, loss of left arm below elbow. Was placed as a rivet heater at 50 cents an hour and has since learned to become a signalman at 75 cents an hour.

Pvt. John Gordon, loss of left arm below elbow. Was placed as a rivet heater at 50 cents an hour and has since learned to become a signalman at 75 cents an hour.

Pvt. Seab Sanders, loss of left arm above elbow. Was placed as a rivet heater at 50 cents an hour and has since learned to become a signalman at 75 cents an hour.

Corpl. J. M. Agnew, loss of left arm above elbow. Was placed as a signalman and is fulfilling the duties at 75 cents an hour.

Corpl. E. Doyle, loss of left arm above elbow. Was placed as an electrical checker at 54 cents an hour.

Pvt. Richard F. Manning, loss of left leg. Was placed as a material checker at $30 per week and is now chauffeur for an official, driving a Cadillac touring car, for which he is being paid $5.50 per day.

Pvt. John C. Jenkins, loss of left arm below the elbow. Was placed as a rivet heater at 50 cents an hour and is now a material checker at $30 per week.

Corpl. Alfred Ballinger, loss of left leg above the knee. Was placed as a steel checker at $30 per week, in which position he has made good, and is now ready for advancement.

Corpl. O. Keown, loss of right arm above elbow. Was placed as a rivet heater at 50 cents an hour and is now fulfilling the duties of material checker in the plumbing department, for which he is being paid 80 cents an hour.

These men were not carefully selected by myself or Col. Schreiner. Two of them are old Regular Army men. Several volunteered, when war was declared, into the Regular Army. Some are from National Guard units, and one was a draftee. I do not think any two are from the same State. Two of these boys had never worked elsewhere than on a farm. Two are old union men.

As you see, you have there a fair representation of 4,000,000 American soldiers, returning home and no pursuits in life. These men were placed and watched, but not hampered. They come and go as they please. They are earning their living and paying their way. Being personally interested in the reconstruction of such men and their future welfare, I have cautioned them from time to time, though not too much, not to allow the good fellowship of those thousands of workmen to take their mind and interests from the fact that they, and no one else, had the battle in life to win. In some cases they were entertained a little too much at first, but in only one case out of the 14 was there any inclination to lay down on the job with the feeling "that the world owes me a living," and that case has been smoothed out satisfactorily. I refer to Manning, the chauffeur, and recommend him as first class in every respect, and to the position of private chauffeur for Mr. Brush.

In addition to these men we have now perhaps 50 returned wounded soldiers working at Hog Island, and the consensus of opinion everywhere there is that they are making good to the man. Your idea was a wonderful one, and even now, with peace at hand, if you are going on with it you would well do these boys the greatest service they can possibly receive and at the same time have reliable workmen and staunch friends. * * * These men have not been

drawing huge wages; they know more of personal sacrifice; they have a keen conception of law and order, more respect for their superiors, and have been disciplined clean down to the bone. Several hundred discharged Army privates and noncommissioned officers, with a few discharged commissioned officers interspersed here and there, will give great balance to this enormous plant in the future.

Respectfully, yours,

JOHN H. OWEN.

"W-58-A."

HOG ISLAND, PA., *January 28, 1919.*

M. C. BRUSH, Esq., *President:*

I submit herewith a condensed report of service men who have been interviewed and the number of men who have been placed for the months of November and December, 1918, and for the month of January, 1919:

Month.	Applicants interviewed.	Number of applicants placed.	Number of applicants rejecting work offered.	Applicants rejected, special reasons.
November	16	16	.....	.....
December	421	378	40	3
January (1 to 28)	1,908	1,661	186	61
Total	2,345	2,055	226	64

During the month of December 87 per cent of the men placed had been discharged from the Army and 13 per cent from the Navy. Of the number hired 9 per cent had had oversea duty and 5.5 per cent of the total number of men had been injured or wounded in the service.

For the month of January 82 per cent of the applicants placed had been discharged from the Army and 18 per cent had been discharged from the Navy. Of this number 17 per cent had had oversea duty and 2.55 per cent had been injured or wounded in the service.

Practically all of the men hired were for outside work. This work has been new to most of these men and they are learning new trades. The percentage of departure is about normal.

A number of the men employed are living either in the barracks or at the E. F. C. Hotel.

These men all seem glad to have some work to do. The morale among the men is generally good.

Approximately 100 men are being interviewed daily. About 80 per cent of these applicants are placed. No men applying for employment have been refused consideration and every effort is made to find some sort of employment for returned service men.

R. W. AITKEN,
Manager Division of Industrial Relations.

Mr. BRUSH. At the last hearing Mr. Piez stated to you gentlemen that the Fleet Corporation had received an offer for the sale of 25 of the A boats. I should like, if permissible, at the close of your meeting this afternoon, to read to your committee in executive session the letter which we sent to Mr. Piez without putting it in the record. I do this because I assume this is private Government business.

I should like to place the following in the record, merely as a matter of general information to your committee.

(The table referred to is here printed in full, as follows:)

"W-43-A."

JANUARY 26, 1919.

This is an extract from the report of the Commissioner of Navigaton for the fiscal year ending June 30, 1918: The table showing foreign carrying trade

of the United States from 1821 to 1918 by years, showing value of cargo, both import and export, and percentage carried in American vessels.

In 1821 88.7 per cent of the combined value of the imports and exports were carried in American vessels. There was a gradual decrease in this percentage until 1914, the year of the world war, when it was 9.7 per cent. In 1915, 14.3 per cent; 1916, 16.3 per cent; 1917, 18.6 per cent; 1918, 21.9 per cent; demonstrating that from the beginning of the war, 1914–1918, the percentage carried in American bottoms had more than doubled. With the great amount of tonnage the Emergency Fleet Corporation completed in 1918 and that in process it will not take a great many years to restore the American flag to the prestige of 1821.

Senator RANSDELL. Where did you get those figures?

Mr. BRUSH. From the Report of Commissioner of Navigation, American Government, for the fiscal year ending June 30, 1918.

Senator VARDAMAN. In 1918 American bottoms carried 21.9 per cent?

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. How much of that bottom was produced by the Hog Island concern?

Mr. BRUSH. Of course, Senator, you know I have just tried to make clear to you that the *Quistconck* sailed January 3, 1919, from Norfolk.

Senator VARDAMAN. You could not give the per cent?

Mr. BRUSH. Hardly, because the *Quistconck* was not in service carrying anything in 1918.

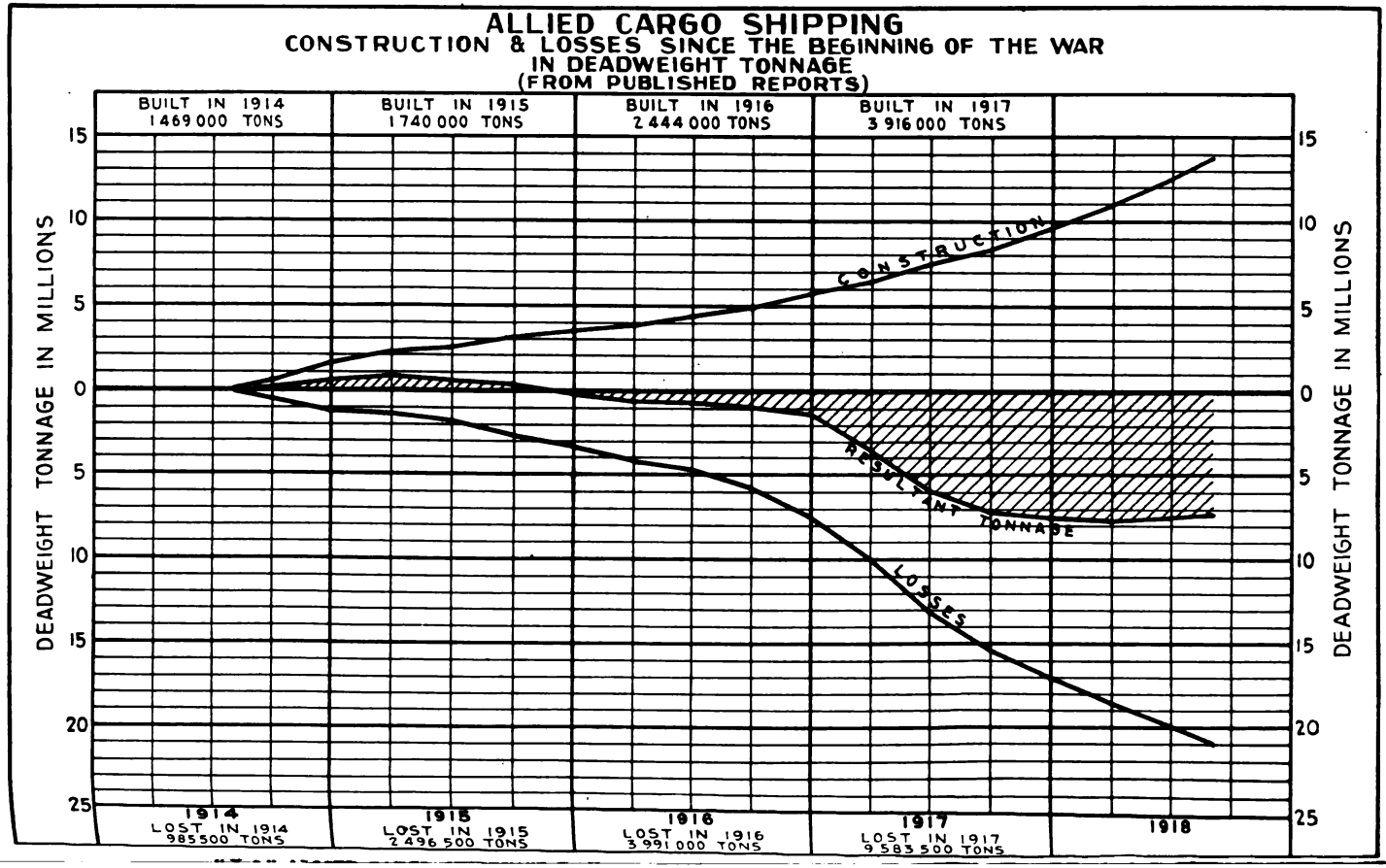
Senator VARDAMAN. It is all right; that is the answer.

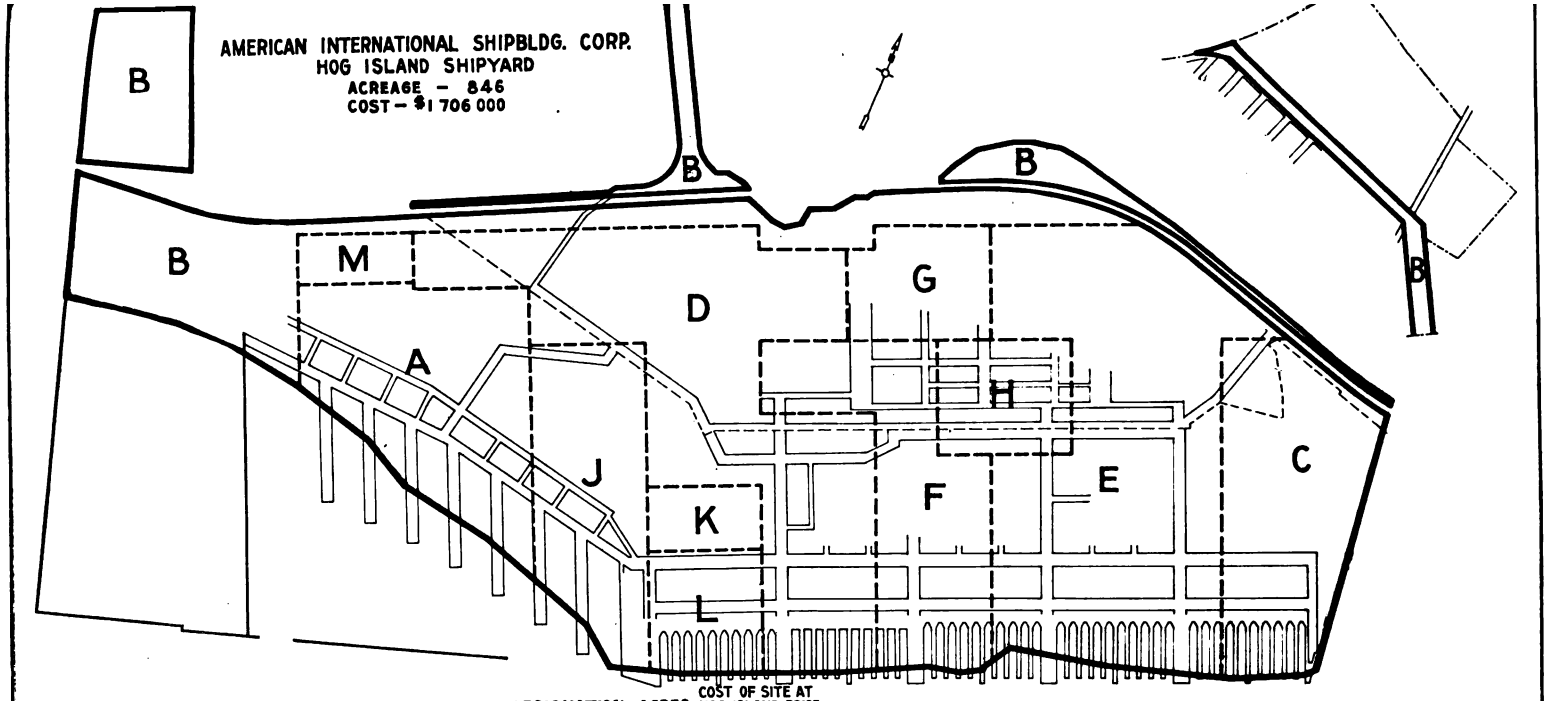
Mr. BRUSH. Here is a chart [illustration, p. 358] I should like to put in your records, which was prepared by a representative of the General Electric Co., showing the construction of allied cargo shipping, the sinking of allied cargo shipping by submarines, and the net result of the two, and the situation from 1914 to 1918 with respect to the rapidity of sinkings, as compared with the rapidity of construction. It was prepared by Mr. Potter, of the General Electric Co.

I should like also to submit for the record the following statement, headed "Comparison of the Area of Hog Island with Twelve Other Shipyards." [See illustration, p. 359.]

Mr. BRUSH. I have taken a standard blue print of Hog Island and superimposed on it according to scale the area of these 12 other shipyards and now wish to present it as an exhibit. [See illustration, p. 359.]

The figures which appear in the lower left-hand corner, taking the price of Hog Island land, which is $1,706,000 and dividing it by 846 acres, gives you the rate per acre, then multiplying the acreage of each of those plants on that plot to determine the price of the land for those respective plants, if purchased at the same price per acre as the Hog Island land. In addition, so far as the land is concerned, there are 81.14 acres of land at the west end of the wet basin, which was purchased by the American International Shipbuilding Corporation for the purpose of filling from our pumping and dredging operations instead of dredging here and loading in scows and taking it away. This property was bought by the American International Shipbuilding Corporation, and this refuse was pumped into it. The price paid for it by the American International Shipbuilding Corporation was $429.47 per acre. After paying the fee to


ALLIED CARGO SHIPPING
CONSTRUCTION & LOSSES SINCE THE BEGINNING OF THE WAR
IN DEADWEIGHT TONNAGE
(FROM PUBLISHED REPORTS)
BUILT IN 1914
1 469 000 TONS
BUILT IN 1915
1 740 000 TONS
BUILT IN 1916
2 444 000 TONS
BUILT IN 1917
3 916 000 TONS
DEADWEIGHT TONNAGE IN MILLIONS
15
10
5
0
5
10
15
20
25
CONSTRUCTION
RESULTANT TONNAGE
LOSSES
1914
LOST IN 1914
985500 TONS
1915
LOST IN 1915
2 496 500 TONS
1916
LOST IN 1916
3 991 000 TONS
1917
LOST IN 1917
9 583 500 TONS
1918



HOG ISLAND COMPARED TO 12 OTHER SHIPYARDS

NAME	LOCATION	DESIGNATION	ACRES	COST OF SITE AT HOG ISLAND PRICE
MERCHANTS SHIPBLDG. CORP.	BRISTOL PA.	A	80	$161 360
SUBMARINE BOAT CORP.	NEWARK BAY N.J.	B	150	302 550
BETHLEHEM SHIPBLDG. CORP.	FORE RIVER MASS.	C	75.5	152 284
FEDERAL SHIPBLDG. CO.	NEWARK N.J.	D	150	302 550
DOWNEY SHIPBLDG. CO.	MARINERS HAR. N.Y.	E	160	322 720
LOS ANGELES SHIPBLDG. & DRY DOCK CO.	SAN PEDRO CAL.	F	70	141 190
SKINNER & EDDY CORP.	SEATTLE WASH.	G	27.3	55 064
SEATTLE CONST. & DRY DOCK (SKINNER & EDDY)	SEATTLE WASH.	H	27	54 459
CHESTER SHIPBLDG. CORP.	CHESTER PA.	J	58	116 986
PUSEY & JONES	WILMINGTON DEL.	K	13	26 221
PENNSYLVANIA SHIPBLDG. CO.	GLOUCESTER N.J.	L	25	50 425
BETHLEHEM SHIPBLDG. CORP. (S.L. MOORE)	ELIZABETHPORT N.J.	M	10	20 170
			845.8	$1705 070

HOG ISLAND COMPARED WITH 12 OTHER SHIPYARDS.

the State of Pennsylvania, legal and other expenses, the net cost per acre was $429.47.

Senator VARDAMAN. Let me ask you in connection with that: Pumping that material out of the wet basin at Hog Island into this low land that you have bought there from the State, does it not greatly enhance the value of that land?

Mr. BRUSH. It decidedly does, Senator.

Senator VARDAMAN. Have you figured on the amount of land that you made, about one-half of Hog Island? I understand when you purchased it, at high tide the water would have been over it 3 or 4 feet every day?

Mr. BRUSH. I do not know that it was as bad as that, but in this particular case I agree with you perfectly. We have taken some private land we purchased and we have filled it in by pumping from the wet basin which the Government paid for and terrifically enhanced the value of that land. That is the reason the United States Government has an option on it at the price we originally paid for it, which is $429.47 an acre.

Senator VARDAMAN. Is that a part of the Hog Island original purchase?

Mr. BRUSH. No, sir.

Senator VARDAMAN. Then the Government has no option on that.

Mr. BRUSH. Yes; because we gave it a sale option.

Senator RANSDELL. On that particular tract at $429.47 an acre?

Mr. BRUSH. Yes, sir. And that land to-day is worth about $3,000 an acre, based on information of Philadelphia real estate people, and the Government has an option to buy it for $429.47 an acre.

The CHAIRMAN. Eighty-one and fourteen one hundredths acres you got from the State?

Mr. BRUSH. Senator Fletcher, we acquired that particular 81.14 acres in this way: What is known as "Little Smith Island" lies out in the Delaware River south and west of our most westerly outfitting pier in the wet basin (Pier G). The Westinghouse people owned a large portion of "Little Smith Island" and we made a deal with the Westinghouse people under the terms of which that company acquired the balance of "Little Smith Island" and the American International Shipbuilding Corporation purchased from the State of Pennsylvania, a patent to the submerged land lying between "Little Smith Island" and our shore line and as one of the considerations to the Westinghouse people, we built a dike from our shore line to "Little Smith Island" and pumped sufficient dredged material from our wet basin back of the dike I just mentioned as being constructed by us, thereby forming that piece of perfectly good high ground that you see on the blue print of Hog Island shipyard that I exhibited to you a few minutes ago. [See illustration, p. 359.] The acreage of "Little Smith Island" was about 21 acres—as a part of the deal we acquired "Little Smith Island" from the Westinghouse people and gave them the same acreage, about 21 acres, of the west portion of this new land. I hope I have made this clear to you.

Senator VARDAMAN. I want to get that clear in my mind. For pumping that out of the wet basin onto this land the Government paid the expenses, did it?

Mr. BRUSH. Yes, sir; and it was a question whether we should pump that out of there onto the land or pump it into barges and dump it somewhere else.

Senator RANSDELL. You had to make the basin to utilize the yards?

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. But the enhanced value of the land from $429.47 an acre to $3,000 an acre, the expense of the pumping, was borne by the United States Government, I understand, so your company is not at any loss for this increased value?

Mr. BRUSH. We have not suggested any loss.

Senator VARDAMAN. I know, but I just wanted that fact brought out.

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. You said you agreed to give it to the Government for the price you paid for it?

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. And it now is worth $3,000 an acre?

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. Implying that you were giving the Government a piece of land that was worth $3,000 an acre for which you paid only $429.47 an acre.

Mr. BRUSH. No; I did not mean to imply that. What I meant to imply was this: The American International Shipbuilding Corporation was under no obligation whatever to buy that land in order to find a place to dump that dredging; they could have dredged all of that material out of the basin, loaded it on barges, and taken it down the river and dumped it elsewhere. As a matter of fact they did invest their money in that land and put this refuse on it. Before doing it, however, they gave to the United States Government an option on the land at exactly what it cost them.

Senator RANSDELL That included the pumping out of the basin?

Mr. BRUSH. Oh, absolutely. I am not looking for any credit; I am merely stating the facts, not trying to argue the case.

The CHAIRMAN. It was to the interest of the Government to have a place to put this material?

Mr. BRUSH. Yes, sir.

Senator RANSDELL. Did it not actually cost less to pump that than if you had loaded it on barges and taken it down the river?

Mr. BRUSH. There is no question of that.

Senator RANSDELL. It cost considerably less, I understand?

Mr. BRUSH. Yes; it cost less to do the dredging than if you took it out of the wet basin and put it on barges; then, again, the expense of lugging it some place else.

The CHAIRMAN. You regard that as an essential part of the whole plan?

Mr. BRUSH. Personally, I do, Senator. I think it is a very valuable part of the ultimate use of the Hog Island property.

Senator RANSDELL. Was not that filling in done with pipe-line dredge?

Mr. BRUSH. Yes, sir; with a suction dredge. The total in square feet area of the 50 shipways is 1,529,560 square feet. The total surface area of our wet-basin piers, marginal wharf, and piers between

shipways in square feet is 1,340,529 square feet. In our wet basin, we have seven outfitting piers 100 feet wide, 1,000 feet long. Those piers were originally arranged to be 66 feet wide, instead of 100 feet, as at present, and the water not so deep. Admiral Bowles, upon his arrival at Philadelphia in the early spring of 1918, decided the future of Hog Island was of such a character that he believed we should make those piers wider and deepen the water more in order that it might be used for terminal facilities, and believed the piers should be built of a much more substantial character; and his letter of April 13, 1918, on file before you explains exactly what he did and why he did it. I will not bother you with the detail of this.

Senator RANSDELL. May I ask if those piers are well adapted for commercial purposes?

Mr. BRUSH. Yes, sir.

Senator RANSDELL. Are those piers available now for commerce?

Mr. BRUSH. They are this minute "as is." Those piers are first-class A1 piers.

Senator RANSDELL. For commerce?

Mr. BRUSH. For commerce, as a terminal; and I will explain later what I have in mind in that connection. Without taking time to go into detail, I merely have with me samples of the forms on which we make purchases for everything that has been used on Hog Island from the day the contract started up to this moment—I will discuss it with your stenographer later, if you will permit me to, as to what extent this may be of interest to you, perhaps, and to what extent not. The requisitions for the material for the plant are required to have the approval of the representative of the Emergency Fleet Corporation, and I have brought here, merely as an example, a number of specific instances of purchases [indicating]. There is a purchase requisition that we make out, which has to be approved by the Emergency Fleet Corporation; then our purchasing men have to send out and secure bids; there is an original bid sheet, and there is the name of the article he is buying; there are the names of the concerns who bid; there are their bids underneath, and there is, in longhand, the approval of the Emergency Fleet Corporation representative as to whom we shall place this order with. That order is then written out and the purchase order is sent out and there is the original, with the man's signature representing the Emergency Fleet Corporation, who signs the order before we can send it out.

Then there comes back the shipping statement or invoice; there is the receipt for the material when it arrives at the warehouse or storage yard; then when that bill comes back our voucher is made out then both the voucher and the check are countersigned, "United States Shipping Board, Emergency Fleet Coropation," by the authorized representative, and every single dollar of your $66,000,000 has just exactly the same Governmental approval on it, and every single piece of material that is bought and goes into your ship, from a cake of soap to the keel, has the Government approval on it, and you have an auditor of the Emergency Fleet Corporation who has an office near our auditor; you have a representative of the Emergency Fleet Corporation whose room is separated from my room only by a three to four inch partition, and we can not make a move without

their approval. This information is kept before your Fleet Corporation from month to month throughout the time of your plant construction and thoughout the time of the construction of your ships.

Senator LENROOT. Of course, you do not know anything about the checking of the material?

Mr. BRUSH. I know something about it, Senator.

Senator LENROOT. It appeared before this committee there was neither upon the part of the American International Shipbuilding Corporation nor the Emergency Fleet Corporation any accurate checking of the material as it came in to see whether it agreed with the amount paid for the material.

Mr. BRUSH. I have read the statement made by Mr. Reed, then the representative of the Emergency Fleet Corporation. It would be an impossibility under the circumstances to absolutely allocate to specific jobs of work in such a plant specific pieces of material. As far as checking the receipt of the material, I do know, Senator Lenroot, that up to a few months ago they had only been able to check that material up to 75 per cent of it, but I have a statement here given me yesterday when I left Philadelphia that 94.33 per cent of it has been accounted for, and the other 5.67 per cent can be checked, in their opinion. This is as of January 29, 1919.

Senator LENROOT. You are familiar with the report of the Department of Justice, are you not?

Mr. BRUSH. Yes, sir; and I also undertook to satisfy myself on that. I do not want to get in over my head, because the Attorney General's report is a legal document, but Mr. P. O. Knight, our vice president and general counsel is here, and if we get into the legal end of it I will let him take it up, but from the standpoint of a practical operating man I was vitally concerned with the statement made with regard to the matter, and therefore asked the men in charge of our work to immediately familiarize me with that, which they have done in a communication under date of January 14, and it would appear that the information which the representatives of the Attorney General had at the time they made the report was not complete—that is, they did not have before them, and I say this without any disrespect, or that anybody was negligent, either their representatives or ours—but I have this letter addressed to our assistant treasurer, Mr. W. W. Dow, from Mr. C. R. Allen. Mr. Allen is in immediate charge, and reports to Mr. Dow. He states as follows. [Reading:]

PREPAYMENTS.

Referring to the statement in the report of the Department of Justice that over $10,000,000 had been prepaid without an effort having been made, previous to their investigation, to prove receipt of the material, I believe this refers to prepayments made to March 1, 1918, the actual amount being $9,806,844.13. As stated in their report, this amount was properly prepaid, as it represents bills paid in advance of the receipt of materials in order to take advantage of cash discounts, and lumber and steel bills accompanied by bills of lading, which were prepaid at the direction of the Government.

In other words, all those prepayments were made at the direction of the United States Government and some of the steel and lumber was purchased, not by us, but by the Emergency Fleet Corporation.

Many of the steel companies, however, allowed a cash discount for prepayment within 10 days.

I have analyzed this figure and find that it is made up of several large amounts that should not have been included. For instance, in the usual run of business it took from 30 to 90 days, or an average of about 45 days, for material to get to the job, and the subsequent clearing of records through the various departments. Therefore $4,366,600.12, representing prepayments (exclusive of steel) made during the period of 45 days previous to March 1, should be deducted from the above amount.

It also includes $1,450,744.65 prepaid during January to rolling mills for raw steel shipped to fabricators in various parts of the United States and Canada.

The hull fabrication department is a department in Hog Island which has charge of all raw steel ordered and all fabrication of steel until the steel arrives on the island and is available for ships.

This class of prepayments is cleared through the records of the hull fabrication department, and had the investigators examined their records they would have found inspectors' reports covering such shipments as had arrived at destination during the period in question. These prepayments, however, had not been reported to the Shipping Board as cleared as of March 1, as the method of reporting this particular class of prepayments had not at that time been decided upon.

In other words, this steel was on the way from the rolling mill to the fabricator, or fabricator to plant. The accounting department records would not show it, but the Hull Fabrication Department records would show it. That department keeps track of all steel up to the time it reaches the island.

These two items in addition to prepayments amounting to $1,018,736.87 which had been cleared previous to March 1, 1918, reduces the original $9,806,844.13 to $2,970,762.49, that it would have been possible to clear had all the material been received, but due to various embargoes and traffic tie-ups, the greater portion of this material, largely lumber, had not been received, and therefore the items could not have been cleared.

Besides, complications in the transportation of lumber had produced countless difficulties in tracing shipments.

The remainder was involved in the routine of the various departments through which the papers had to flow. There was, of course, no discrimination against material receipts covering prepaid items as compared with those covering straight payments inasmuch as the receiving department had no way of making this distinction and sent both classes to the invoice division, where they were handled simultaneously.

During the latter part of February, however, when we were planning to move from Philadelphia to Hog Island, all but one or two men were taken off the work of proving prepayments to assist in putting through for payment all the invoices possible before the moving period in order that payable accounts would not be unduly delayed thereby. As soon as we arrived at the island the work of proving prepayments was resumed with a larger force and has functioned continuously since.

Below is a summary of the above explanation:

Prepaid to Mar. 1	$9,806,844.13
Less prepayments for the period of 45 days previous to Mar. 1	4,366,600.12
	5,440,244.01
Less prepayments for steel	1,450,744.65
	3,989,499.36
Less items cleared to Mar. 1	1,018,736.87
Greater portion of this material had not been received at the island. The remainder was in the process of being cleared	2,970,762.49

But regardless of the amounts shown in the above analysis, it is charged by ıe Department of Justice that "no effort was made by the agent until our investigation to prove whether prepaid bills were in fact followed by actual receipt of the material paid for," and I submit that not only was the proving of repayments a part of the system three months before the investigation was tarted, but that a very appreciable quantity had actually been cleared before ıe investigation, as evidenced by the figures above.

The detailed information which I undertook to show you in regard o handling material for the plant is absolutely identical with the ıanner of handling material for the ship.

Mr. Levy calls my attention to the fact that the procedure now beng carried out and then being carried out to advise the corporation f the receipt of prepaid materials was established during October, .917, when they first opened the accounts, and was thereafter a matter ıf office routine.

Without unnecessarily taking your time, I have a report before me, vhich is too long to read, but it shows the purchases made from Sepember 17, 1917, to December 31, 1918, amounting to 66,631 purchase ırders, each of which, like the ones that I have shown you, requiring a purchase requisition, bid sheet, purchase order, material receipt, voucher, and each one requiring a check; each one of these documents, with the exception of the material receipt, requiring the approval of the authorized representative of the Emergency Fleet Corporation.

This summary has been prepared by examining each purchase order, figuring the total commitment noted thereon, and listing the total commitments for each commodity. We have used the executive file of orders, which is practically complete, and have checked with our order register to insure having all purchases listed. The total commitment of each order has been accurately figured and proper adjustment made to take care of memoranda of changes. The actual payment on some orders may differ slightly from the figure we have used, as, generally, no memorandum of changes is issued to cover minor overs and shorts, and we have not taken into account cash discounts for the prepayment of invoices.

We have had several men classifying the total commitments under the various headings and have endeavored to make this classification uniform, but some items have undoubtedly been classified differently, owing to difference in interpretation. This variation, however, will not affect the grand total. Many of our purchases are in the nature of blanket orders, on which no total can be figured from the records maintained in this division. On such orders we have examined the Accounting Department records and have listed the total payments made as recorded thereon. This method has also been followed in arriving at the total commitment on subcontracts involving labor and material or fees. We have included only such subcontracts as have been covered by formal purchase orders.

In preparing this statement we have made no attempt to differentiate between direct "Plant'" and "Maintenance and Repairs" charges.

Many materials purchased on "Plant" orders have undoubtedly been used in Ship Construction, but we understand that proper accounting adjustment has been made to cover these items.

You will appreciate that our total figures do not represent the actual payment, as much of the material contracted for has not been shipped or billed. No freight or express charges are included in our total except such as are specifically covered by purchase orders or included in vendors' prices, but practically all trucking charges are listed, as they are usually covered by formal orders.

A number of commodities are purchased at a price which includes the container, such, for instance, as cement, some oils, acids, etc., and we have made no deduction for the return value of such containers.

In view of the explanation I have made as to how these figures were prepared, you will please understand that they are presented to you for the sole purpose of placing before you in a general way the approximate cost only of the different classes of material and of certain contract services that entered into cost of your shipyard at Hog Island.

I do not want to take your time, but if I may just run through the total figures, the total orders for plant shown here [indicating] amount to $39,708,223.67.

The totals of the different classes of material and contract services entering into the cost of the plant are as follows:

Rolling stock	$1,083,508.17
Marine equipment	694,858.17
Vehicles	546,867.29
Construction equipment	2,061,522.15

Senator VARDAMAN. What vehicles were those that were purchased there?

Mr. BRUSH. Passenger automobiles, $60,928.43; motor trucks, truck bodies, and wagons, $235,304.50; passenger automobile and truck repairs and accessories, $250,634.36, covering a period of 16 months.

Senator VARDAMAN. $60,000 for passenger automobiles?

Mr. BRUSH. Yes, sir. It is approximately 2¼ miles from one end of the plant to the other. We have figured that a Ford automobile or a $1,200 or $1,400 automobile is a good deal cheaper than a man, when it came to going from one end of the plant to the other, or from the plant to Philadelphia and back.

The Emergency Fleet Corporation have entirely concurred in that, and they furnish all of their representatives, without regard to us at all, with automobiles. No automobiles used by officers of the American International Corporation have been paid for by the Government or operated or kept in repair at the expense of the Government. The automobile which I drive, the ones which the five vice presidents drive, are paid for by the corporation without any expense on the part of the Government.

Shop equipment, rolling stock, etc. I will not take your time by reading that. I will have my assistant go through this statement and insert in the record what is of value.

The CHAIRMAN. Yes; that will be sufficient.

Mr. BRUSH. Because it is a tremendous job.

(The statement referred to is here printed in full as follows:)

JANUARY 28, 1919.

(W-56.)

PLANT ORDERS.

Rolling stock: Locomotives and repair parts, passenger coaches, box cars, flat cars, hand cars, dump cars, rolling stock, repair parts, and supplies	$1,083,508.17
Marine equipment: Marine equipment repairs, and supplies	694,858.17
Vehicles: Passenger automobiles, motor trucks, truck bodies and wagons, passenger automobile and truck repairs and accessories	546,867.29
Construction equipment: Pile-driving equipment, derricks and fittings, concrete machinery, locomotive cranes and repair parts, miscellaneous engines and hoists, road and trenching equipment, trench pumps, miscellaneous yard equipment, carbic lamps and carbic, explosives, machinery repair parts	2,061,522.15
Shipway hoisting machinery: Shipway derricks, steel derrick towers, electric derrick hoists, outfitting cranes	3,605,999.32
Pneumatic equipment: Air compressors, repairs and accessories, pneumatic tools	1,373,989.39
Cutting and welding equipment: Cutting and welding apparatus and supplies, compressed acetylene, oxygen, carbohydrogen	219,018.69
Rigging: Manila rope and hemp products, wire rope, cable and iron wire, chain, blocks and sheaves, chain hoists	687,099.25
Pumps: Pressure pumps, centrifugal pumps, miscellaneous pumps	86,976.84
Forest products: Lumber, railroad crossties and switch timber, piling, electric-line poles	6,159,404.78
Construction materials: Portland cement, crushed stone, sand and gravel, slag, cinders and earth, brick, lime	769,501.64
Building materials: Steel sash, ventilators, skylights, roofing, building hardware, wall board, doors and windows, wooden sash and glass, elevators	465,240.93
Fuel: Coal, bituminous and anthracite, coke, fuel	549,120.45
Petroleum products: Lubricating oils and greases, tarvia and pitch, gasoline, kerosene	288,601.23
Paints: Paint and lead, linseed oil	212,127.54
Rubber products: Hose and hose couplings, rubber boots, oiled clothing	628 351.18
Packing: Lamp wicking, packing, waste	167,290.88
Transmission: Belting, shafting, hangers, and pulleys	27,229.33
Ship-construction tools: High-speed twist drills, carbon and miscellaneous drills, bridge reamers, rivet sets, countersinks, tool boxes	1,126,417.05
Tools: Track tools, shovels, picks, crowbars, wheelbarrows, wrenches, jacks, files, lumber-handling tools, anvils, vises, miscellaneous hand tools, brushes and brooms, abrasives and abrasive tools, water buckets, cans, etc	579,023.42
Shop tools and equipment: Shop cranes, boring machines, milling machines, flaring machines, shapers, plate and angle furnaces, bending slabs, bending rolls, drilling machines, shears, grinders, lathes and planers, pipe machines, forging hammers, punches, blowers, beveling machines, power hack saws, miscellaneous trucks, woodworking machines, hydraulic machines, spacing tables, presses, forges and parts, torches and burners, bolt, nut, and rivet machines, miscellaneous taps, dies and punches, miscellaneous shop equipment	1,868,954.50
Rolling mill products: Steel bars, steel shapes, steel plates and sheets, steel reinforcing, tool steel, steel spiral pile shells, steel sheet piling, rails and fastenings, special track work	2,196,017.22
Manufactured iron and steel products: Bolts and nuts, fitting-up bolts, drift bolts and pins, spikes (not railroad), nails, rivets, washers, screws, miscellaneous castings	2,127,606.14

Miscellaneous metals: Spelter, copper and brass bars and tubes	$22,493.48
Piping: Cast-iron water pipe and fittings, sewer pipe, corrugated iron pipe, wrought and steel pipe, hydrants, valve boxes and meters, valves and manifolds, pipe fittings	1,687,675.43
Plumbing and heating: Plumbing fixtures and supplies, lavatories, radiation, insulating materials, stoves and stove pipes, boilers and boiler fittings, lead and solder, steel stacks, breechings, miscellaneous tanks, and so forth	535,208.52
Electrical installation: Transformers, motors, control and repair parts, switchboards and fittings, copper wire and cable, rigid conduit, fiber conduit, lighting fixtures, incandescent lamps, miscellaneous electrical apparatus, miscellaneous electrical fittings and wiring devices, flashlights and dry batteries, electric fans	2,011,513.41
Live stock and maintenance: Horses and rentals, hay, oats and grain, stable supplies	212,714.96
Subcontracts: Shipway construction, dredging, railroad and dike construction, plumbing and heating system, high pressure piping system, excavating	2,788,087.66
Contracted labor and material: Ways steam-heating system, yard and shop construction, roads, railroads	1,104,510.29
Engineering and inspection service	177,274.15
Rentals: Passenger automobiles, auto trucks and teams, yard equipment, marine equipment	2,270,223.78
Utilities: Electric power, water service	300,585.48
Transportation: Passenger train and steamboat service	364,380.11
Miscellaneous freight charges	29,280.81
Fire protection: Fire alarm system, fire fighting equipment and supplies	154,887.12
Plant protection: Yard call system, firearms and ammunition, plant protection supplies, badges and buttons, safes, insurance, steel lockers, fencing wire	173,851.23
Industrial relations: Sanitary equipment and supplies, hospital equipment, commissary supplies, miscellaneous equipment and supplies	60,728.22
Miscellaneous: Technical and precision instruments, miscellaneous instruments, time stamps and clocks, miscellaneous, shipyard candles, diving outfits, stationery and printing, canvas and tarpaulins, photographic supplies	290,083.46
Total plant orders	39,708,223.67

I would like to make clear, if I may, in connection with this purchase of material, the fact that lumber, piling, railroad ties, wire rope and cable, nails, ammunition and rifles, cement, gravel, stone, sand, coal, fuel oil, etc., were purchased by the Emergency Fleet Corporation. They required us to purchase through them or other governmental agencies. Practically all of the automobiles to which reference has been made were purchased by us after first securing the written approval of the authorized representative of the Fleet Corporation. A few of them were purchased for us by the Emergency Fleet Corporation.

We gave a requisition to the Emergency Fleet Corporation, and if they saw fit to approve it, they did approve it, and if they saw fit to buy it, they did so, and if they did not approve it we did not get it. Many of the materials purchased for plant construction have been bought by the United States Shipping Board Emergency Fleet Corporation or other Government agents.

Our practice has been to place a purchase order either with the Fleet Corporation or some other Government agency or to place

'ders direct with the vendors designated by them. This corpora-on took no action in awarding the order or in selecting the vendor, : in arranging the price and terms or other details.

These items represent approximately 20 per cent of our total plant urchases, and of this 20 per cent we estimate that 90 per cent was urchased through Government agency and the other 10 per cent 'as purchased direct by us from the vendor that the Government ight specify.

From the start we were furnished with a list of articles that the Jnited States Shipping Board desired to make purchases of themelves. In such case, they advised us of the name of the article, the rice to be paid, etc. This covers articles in great demand for the onstruction of ships by the Government.

Without taking your time, here [indicating] is a complete treatise f the manner in which all of these articles were purchased through he Government agency.

(The statement referred to is here printed in full, as follows:)

(W-50.)

JANUARY 28, 1919.

M. C. BRUSH, Esq., *President:*

Many of the materials purchased for plant construction have been bought through the United States Shipping Board Emergency Fleet Corporation or other Government agency.

Our practice has been to place the purchase order either with the Fleet Corporation or other Government agency, or to place orders direct with the vendors designated. This corporation took no action in awarding the order or in selecting the vendor or in arranging the price and terms.

The following items were purchased in the above manner: Lumber, piling, railroad ties, wire rope and cable, nails, ammunition and rifles, cement, gravel, stone, sand, coal, fuel oil, passenger automobiles.

These items represent approximately 20 per cent of our total plant purchases, and of this 20 per cent we estimate that 90 per cent was purchased through Government agency and the other 10 per cent was purchased direct by us.

(Signed) ROBT. E. HAMILTON,
Manager of Purchases.

If I may, without unduly taking the time of the committee, I would just like to read into the record this extract from the testimony of Mr. Charles M. Schwab before the House appropriations subcommittee in May, 1918:

The CHAIRMAN. So, from a physical and mechanical standpoint, the plant appealed to you?

Mr. SCHWAB. I think that it is splendid. I had not been there before. I was most agreeably surprised with the thoroughness with which the work was being done and the broad manner in which the plant had been laid down.

That, of course, referred to Hog Island.

I would like also to call attention to the statement of Commander Stevenson Taylor, president of the American Bureau of Shipping, which is printed in the record of the hearings before this committee in March of last year.

On page 2387 Commander Taylor says:

In the first place, the plan of the yard is well conceived for the production of the ships in the time mentioned.

And on page 2388 Commander Taylor says:

Thirty ways is the minimum number; 40 certainly better, and 50 even better than 40, when time is such an important element.

The plan for transportation and yardage seems to be appropriate for carrying out the progress. Of course it is necessary that outside lines be made to meet those within the yard.

Senator VARDAMAN. When did he make that statement?

Mr. BRUSH. I can not give you the date; perhaps Mr. Fay can give it.

Mr. C. J. FAY. It was on March 27, 1918.

The CHAIRMAN. March 27, 1918?

Mr. BRUSH. Yes; he also said:

We believe that the sufficiency of the organization will be apparent as the work proceeds.

Considering the unusual demand for labor, the breaking down of the railroad service in transportation and deliveries, and the extreme weather conditions—the worst weather known since official records have been made—the results obtained have been remarkable, though extremely expensive.

The labor cost must have been doubled by the aforesaid conditions, even though those planning the yard considered the site and other matters connected with the execution of the construction.

and at page 2389—

These men have gone into this thing with a breadth of vision that to me is remarkable. I think I can consider myself justifiably an old-fashioned man.

* * * But I can see the greatness of this thing; I have the vision to do that; and I sincerely hope that nothing will interfere with the production of their ships on this plan.

That is the statement of the present head of the American Bureau of Shipping. The chairman then asked him the following question (page 2390):

The CHAIRMAN. As to the site of the plant, you found it low and marshy, did you not?

Commander TAYLOR. There is no trouble about that. I believe that is the best place you could have found; I do not know of any better place.

And I should like to quote also the statements of Mr. James French, chief surveyor for the United States and Canada, Lloyd's Register of Shipping, which are found on page 2392 of the hearings before your committee. It is as follows:

I also told him that I considered that the yard was well conceived to carry out the program which had been intrusted to the American International Corporation. I also said that I did not consider that any number less than 50 of ways would be sufficient to complete the program in 22 months; in fact, it was absolutely necessary, in my opinion, to have that number of ways.

Senator VARDAMAN. Have you any hope of completing the program within the 22 months?

Mr. BRUSH. No, sir. Do you mean completing the program for the construction of the ships?

Senator VARDAMAN. Yes; the program with reference to completion of the ships.

Mr. BRUSH. I do not know of any human being, or any power, that could have completed it, after having gone through what these men went through with a year ago.

Senator VARDAMAN. Well, but that was his opinion, as you have just read it.

Mr. BRUSH. Yes. I will continue to read from Mr. French's statement (page 2393):

I do not know that I have anything more to say, Mr. Chairman, except that I have really been astonished to see the progress that they have made since September. I could never have conceived anything of the kind, if I had not seen that yard. It is the greatest thing of its kind in the world, to my mind, because I have visited all the yards in England and Scotland, and in Canada, and in this country. And no one can have any conception of the plant unless they have seen it.

There is no yard like this anywhere.

Palmer's have two yards, and they have about 12 ways between them. As to Harlan and Wolf, I should say that, with their 2 yards in Belfast and 4 yards in Scotland, they may have about 36 ways.

I understand that the new yard, which I believe is a Government yard, put down at Bristol, England, has about 34 ways.

I understand that they are complete; I do not know definitely. They have adopted, I may tell you, the system now used at the Hog Island plant—the fabricated system; and it is the first time in the history of shipbuilding over there that they have adopted that. I think they have taken a leaf out of the American people's book.

I went there in the course of my official duties.

I approved the plan of the yard and also the type of boat.

Mr. BRUSH. I will put into the record, if I may, the total amount of lumber and piling at Hog Island, without taking your time to read it. I will only say that the total number of lineal feet of piling was 7,727,622.

(The statement referred to is here printed in full as follows):

(W-31.)

JANUARY 26, 1919.

LUMBER AND PILING INFORMATION.

Number of piling driven	151,522
Average length (feet)	51
Total number of lineal feet	7,727,622

RAILROAD TRESTLE.

Figured on basis of 30-foot length, 5-pile bents, 14-foot centers, would make a railroad trestle 137 miles in length (almost the distance from Philadelphia to Washington).

AREA OF PILING.

Piling driven on an average of 5-foot centers, which means 25 square feet per pile, covering approximately 87 acres, which is equal to a plot of ground one-fourth mile wide and one-half mile plus 230 feet long.

PILE FOUNDATIONS.

Thirty-three per cent of all structures on Hog Island property are on pile foundations.

LUMBER.

Total purchased for plant construction, 150,000,000 feet.

MEMORANDUM.

This would make a plank walk 1 inch thick and 12 inches wide, 28,409 miles in length, which is long enough to make a plank walk practically the entire distance around the world and have enough left for a plank walk across the United States.

Senator VARDAMAN. This would be a very good place to put in the cost of this whole thing; it is enormous, I am sure; and it is a very enormous plant at Hog Island. But I have had a young man estimate for me that if the dollar bills to be spent at Hog Island—this 66,000,000 greenback dollar bills—were placed from end to end they would girdle the earth at the Equator 330⅛ times. That only shows the magnitude of it and the magnitude of the cost. [Laughter.]

Mr. BRUSH. I will ask Mr. Levy to check those figures up for me and see if the young man who gave those figures to you is correct.

Senator VARDAMAN. Well, I just asked somebody to work it out for me.

Mr. BRUSH. Why do you make it $1 bills? Why not make it $10 bills?

Senator VARDAMAN. Because the average man in the country who is paying the expenses of this thing has the $1 bills and has not the $10 bills; he is familiar with the $1 bills but not with the other. [Laughter.]

The CHAIRMAN. Do you not think that anybody but the $1 man is paying it?

Senator VARDAMAN. They are paying it in the last analysis; there is no doubt about that.

Mr. BRUSH. I will not take your time to put in here information which I think should go into the record; it is merely statistical, and I know these things would tire you; but it merely shows the tremendous amount of work which has been done at that plant to account for those possible 330 circlings of the Globe with $1 bills. These statements show the magnitude of the transportation facilities, the cranes, derricks, and marine equipment, and also the telephone system. For instance, you have 1,542 telephones in service at Hog Island. I showed you to-day a photograph of the telephone building. We have above ground, under ground, and in buildings and structures 2,617 miles of wire based on cable and twisted pairs. As a matter of actual fact, this telephone system is about equivalent to a system for a city of the size of Reading, Erie, or Lancaster, Pa.

The photographs of the permanent shops I have shown you.

The fire department consists of four complete fire stations. And you have never had a serious fire at Hog Island.

(The statements referred to are here printed in full, as follows:)

(W-22.)

JANUARY 26, 1919.

NUMBER OF TRANSPORTATION FACILITIES—CRANES, DERRICKS, AND MARINE EQUIPMENT.

Railroad:	
Locomotives	16
Passenger cars	20
Freight cars	469
Motor equipment:	
Motor trucks, busses, ambulances, fire equipment, tractors, and automobile business cars	206
Trailers	33
Horse-driven vehicles, wagons, water wagons, pole wagons, sweepers, sprinklers, dump carts, etc	38
Horses	62

Locomotive cranes:	
Booms 44 to 70 feet	70
Capacity, 15½ to 150 tons.	
Boom radius (length of boom), 44'–70'.	
Fixed derricks on shipways:	
5-ton stiff-legged derricks on towers	400
12-ton stiff-legged derricks on ground	50
12-ton stiff-legged derrick at training school	1
Self-propelling gantry cranes:	
7-ton, 50-foot radius	4
6-ton, 40-foot radius	24
Overhead bridge crane, 100-ton capacity	1
Marine equipment:	
Floating derricks, lifting capacity 6 to 65 tons	7
Pile drivers, 70 to 75 feet lead	4
Barges and lighters	17
Tugs	6
Motor boats	8

(W–24.)

JANUARY 26, 1919.

TELEPHONE SYSTEM.

Total in use, 20 positions, 82 trunks, 1,542 stations.
Average number of calls per day during month December, 1918, 25,976.
Aggregate number of calls from time job started to December 31, 1918, 6,635,051.

Miles of wires:		
Above ground, exclusive of buildings, based on cable pairs	393	
Underground, based on cable pairs	2,042	
In buildings and structures, based on cable and twisted pairs	182	
		2,617
Temporary wire, all of which has been taken down	396	
Total miles of wire installed from time job started to Dec. 31, 1918, including temporary wire		3,013
Number of telephones in service		1,542
Number of temporary telephones, all of which have been disconnected		625
Total number of telephones installed from time job started to Dec. 31, 1918		2,167

Based on information secured from the Bell Telephone Co., our daily traffic compares with the following cities:

City.	Population.	Number calls daily.	Our highest daily traffic.	Average daily traffic.
Reading, Pa.	142,000	31,000	31,995	25,976
Lancaster, Pa.	93,000	32,000	31,995	25,976
Erie, Pa.	115,000	25,000	31,995	25,976

In the cities of Reading and Erie there are competing telephone companies.

First telephone installed at Hog Island September 22, 1917, in a checker's shanty.

First switchboard installed October 14, 1917, three trunk lines, 5 stations. Telephone development at Hog Island from October 1, 1917, to December 31, 1918, a period of 15 months, when, based upon similar development in an average community, would be equivalent to approximately 10 to 20 years' growth.

The difficulties of installing the telephone system were varied and trying. Difficulties of maintaining overhead wires were very great, owing to number of locomotive cranes with their long booms constantly tearing down the wires.

(W-29.)

PERMANENT SHOPS.

JANUARY 28, 1919.

Number of buildings: Twelve.

Character: Ten steel frame, covered with corrugated iron and two wood frame construction. Floor area, 800,000 square feet.

Handling equipment: Modern electric traveling cranes.

List of shops (12 shops): Galvanizing shop, pipe shop, pipe shop annex, machine shop No. 1, machine shop No. 2, maintenance shop, smith shop No. 1, smith shop No. 2, smith shop annex, plate and angle shop, plate and angle shop No. 2, welding shop.

Number of men employed: Average for month of December, 1,284 men.

Shop equipment: Modern machinery and equipment of all kinds; all machinery electric or hydraulic driven.

(W-26.)

GUARD AND FIRE PROTECTION.

JANUARY 28, 1919.

Number of fire stations: Four.

Convenience of location: So located that department can reach any portion of the yard within 2 minutes 30 seconds after sounding of alarm in fire station.

Equipment.—Two stations with two combination pump and hose wagons, capacity 750 gallons per minute, carrying 1,000 feet of 2½-inch hose.

One combination hose and chemical engine, carrying 1,000 feet of 2½-inch hose and one 50-gallon chemical tank with 200 feet of ¾-inch rubber chemical hose.

One city service truck, fully equipped, carrying 50-foot extension ladder.

Two hose tenders, carrying 750 feet of 2½-inch hose.

Two chief's cars.

One chemical engine with two 35-gallon tanks.

Two stations with four combination hose and chemical engines, carrying 1,000 feet of 2½-inch hose, and one 50-gallon chemical tank with 200 feet of ¾-inch rubber chemical hose.

Two hose tenders, carrying 750 feet of 2½-inch hose.

Total equipment (all equipment gasoline-motor driven).

American La France combination pump and hose wagons	2
Brockway combination hose and chemical trucks	5
City service hook and ladder truck	1
Chemical engine with two 35-gallon tanks	1
Chief's cars	2
Hose tenders	4
Pieces	15

Personnel: Seventy-two officers and men, who, in addition to their duties of manning fire stations, maintain constant patrol through shipyard and buildings.

Alarm system: 409 boxes.

Fire extinguishers.—Buildings equipped with a total of 4,247 chemical extinguishers; containers, 829; water buckets, 985; water barrels, 430; hose reels, equipped with hose, 194; axes, 42.

Fire Hose.—Including fire hose on apparatus: Fire apparatus and hose reels, a total of 56,700 feet of hose, which would reach a distance of over 10.7 miles.

Marine fire protection.—Six tugs, equipped with fire-fighting apparatus, and 150 feet of 2½-inch double-jacket, rubber-lined hose. One tug, pump capacity 400 gallons per minute; 2 tugs, pump capacity 300 gallons per minute; 3 tugs, pump capacity 250 gallons per minute.

City fire department.—The fire department and equipment at Hog Island is sufficient to protect an ordinary city of 50,000 population.

Guards.—Number, October, 1918, 545 men; January 25, 1919, 227 men.

Water protection.—Two fast motor launches, equipped with machine gun and carrying crew of four men each.

Statistics.—For the year 1918, 16,433 cases and investigations handled; 433 draft delinquents turned over to the Department of Justice; 254 alien enemies either turned over to the Department of Justice or escorted from the island.

I think this statement with regard to the commissary department should go in the record, Mr. Chairman.

As a matter of actual fact, they have carried on at the island since they started a commissary business which, like the rest of our operations, is under the general direction of the Fleet Corporation, and they have served on the island 4,369,000 meals, plus 74,910 box lunches. They have done this over a period of 16 months, and in addition to the meals served they have barracks buildings in operation to the number of 46, with a sleeping capacity of 4,400; average number of beds furnished one night since the beginning of the job to December 31, 1918, 4,113. The amount of equipment required in these barracks is 50,984 beds, cots, blankets, quilts, mattresses, sheets, pillow cases, etc.

The commissary department has been in operation for 16 months, and during this period the income from operation exceeds the cost of labor and supplies by a total of $47,000, or an average of approximately $2,937.50 per month, which is about as close as it can be run on the basis of a policy to break even; in other words, not make any money from the employees for the furnishing of meals, beds, and other necessities.

In conducting our commissary operations, like all the other of our operations at Hog Island, we are acting as the agents of the Fleet Corporation, and this profit is credited to the job.

(The statement referred to is here printed in full, as follows:)

(W–23.) JANUARY 27, 1919.

COMMISSARY DEPARTMENT.

Hotels	2
Main cafeteria	1
Service restaurants	12
Mess halls	2
Guards' mess halls	3
Small construction camps	3
Total	23
Seating capacity at one time	10,450
Total number of meals served in December, 1918	420,000
Aggregate number of meals served from beginning of job to Dec. 31, 1918	4,369,000
Plus box lunches	74,910

General information showing magnitude of operation.

Maximum capacity of all eating places in one period of 45 minutes	17,800
Range surface—square feet	1,240
Dish-washing machines; capacity, 100,000 pieces per hour	21
Pieces of dishes, glassware, silverware, waiters' trays, etc	259,900
Baking capacity in 24 hours—tons	21

Consumption of foodstuffs since job started.

Loaves of bread (3 pounds each)	225,475
Potatoes—pounds	1,728,000
Cabbage—do	153,400
Onions—do	136,000
Carrots—do	85,000

Fresh apples	boxes	6,000
Dried beans	pounds	131,478
Flour and substitutes	do	1,448,275
Meats	do	1,498,388
Poultry	do	41,932
Fish	do	187,170
Butter	do	117,933
Sugar	do	450,000
Eggs (1,499,400 eggs)	dozen	124,950
Coffee	pounds	113,257
Canned milk	cans	154,400
Fresh milk	quarts	191,250
Fresh cream	do	43,465
Canned fruits and vegetables	gallons	101,316
Vegetables (2-pound cans)	cans	468,420
Evaporated fruit	pounds	46,500
Ice cream	quarts	100,580
Lard and shortening	pounds	135,847

Barracks.

Number of barrack buildings in operation	46
Sleeping capacity	4,400
Average number of beds one night since beginning of the job to Dec. 31, 1918	4,113

Amount of equipment required.

Beds, cots, blankets, quilts, mattresses, sheets, pillow cases, etc	50,984

In connection with that, the housing question has been discussed, and I have here a statement from Mr. W. F. Wilmoth, the Emergency Fleet Corporation representative in charge of the housing for Hog Island. I think that should be made clear to the committee because it has been discussed several times before.

We have near Hog Island, in addition to those barracks to which I have just referred, containing sleeping accommodations for 4,400 men—which have been self-supporting—a 2,100-room hotel which the Emergency Fleet Corporation has constructed, about 1¼ miles north of Hog Island, which we have nothing to do with other than to operate for the account of the Emergency Fleet Corporation.

In addition to the 1,554 new houses built for ship workers—953 of which have been completed and rented and 601 houses now under construction and will be completed by spring—436 houses were already built or in the process of construction and were requisitioned by the Fleet Corporation, making the total program for houses for Hog Island workmen 1,990 houses.

Senator RANSDELL. Do you mean rooms or houses?

Mr. BRUSH. Houses, in the latter case. This report [indicating] is made by a representative of the Emergency Fleet Corporation. He says [reading]:

(W-32.)

STATEMENT TO MR. M. C. BRUSH, PRESIDENT, REGARDING HOUSING FOR HOG ISLAND.

The housing program for Hog Island called for 1,990 houses: 1,554 new houses and 436 which were already built or in process of construction and which were requisitioned by the Fleet Corporation.

Of the 1,554 new houses, 953 have been completed and all are rented but a few, the leases for which will be signed during the present week.

The 601 houses now under construction will be completed in the spring.

The new houses are being rented to shipyard employees for $24 and $26 a month, except the corners, which are higher. This shows a gross income on the total investment of 8½ per cent, or about 6 per cent net.

A considerable number of the new houses have been sold to shipyard workers at 5.3 per cent less than their actual cost to the Fleet Corporation, including the cost of buildings, land, and all improvements.

Since the armistice has been signed the housing situation in Philadelphia has somewhat improved and it was decided that the 1,554 new houses would be sufficient to take care of the shipyard employees. It was, therefore, determined to get rid of the scattered houses which were requisitioned throughout the city, and 300 of these have already been sold, mostly to the general public, showing a loss to the Fleet Corporation of a little less than 8 per cent on the cost.

All the 1,990 houses are of substantial brick construction, in well built-up portions of the city, all of the new houses containing six rooms. The total cost of the 1,990 houses will be about $6,800,000, or $3,417 each. Included in the above is a surplus of ground, amounting to 434 lots, which can be sold for at least $150,000, further reducing the loss to the Fleet Corporation. The sales that have been made demonstrate that there is a demand for the properties and that they can be sold to the employees of the shipyard and to the general public at a loss to the Fleet Corporation not exceeding 10 per cent of the total cost.

W. F. WILMOTH.

January 29, 1919.

That report is from Mr. W. F. Wilmoth, the representative of the Fleet Corporation, and it may be of interest, in view of the testimony at your hearing a week ago.

Senator VARDAMAN. Does that mean that the Fleet Corporation bought houses and then sold them?

Mr. BRUSH. Yes, Senator.

The CHAIRMAN. It requisitioned them?

Mr. BRUSH. Yes, it requisitioned them; and we had nothing to do with it, you understand.

Senator VARDAMAN. I know; but as a matter of fact, has real estate in Philadelphia declined in that time? Why should there have been a loss on those houses?

Mr. BRUSH. I have only lived in Philadelphia since the 13th of December; so I am not qualified as an expert on real estate.

Senator VARDAMAN. Well, you were reading about that.

Mr. BRUSH. Of course, I can not give figures as to Philadelphia real estate costs, but [Mr. Levy here interrupted Mr. Brush and passed a paper to him]—Mr. Chairman, may I stop here just a moment and explain that Mr. Levy has had checked this memorandum which Senator Vardaman handed me a few minutes ago in which the Senator stated that he had a young man estimate for him that, if dollar bills were placed end to end in an amount equivalent to the cost of Hog Island, they would girdle the earth at the Equator 330⅓ times. I find that the young man who made this calculation for Senator Vardaman made a mistake of approximately 100,000 per cent. He got twisted on his decimal points. Instead of this amount of money being equivalent to dollar bills laid end to end encircling the globe 330⅓ times, it actually figures that they would extend over a distance of about 7,709 miles, or not quite one-third the distance around the globe once. I am correct in that, am I not, Mr. Levy?

Mr. LEVY. Yes.

Mr. BRUSH. That is some error.

The CHAIRMAN. That is a slight error.

Mr. BRUSH. Well, if we ever made an error like that we would probably be sent to jail.

Senator VARDAMAN. He is about as lax in his estimate as the corporation was in figuring the cost of Hog Island.

Mr. BRUSH. Yes; but he did not have to make any guesses. All he had to do was multiply, point off, and divide correctly, which is simple mathematics. Further, he had a beautiful day on which to do his work, while we did ours with a temperature of 4° below zero. Further, he was not called upon to make any guesses or to use his judgment without knowing what conditions with which he was to be confronted or what the future might hand him. He could readily find out by measuring a dollar bill that it is approximately 7¼ inches long and knew perfectly well there was no danger of the Macy Board stretching the bills or the transportation of the country making the bills longer or shorter. [Laughter.]

I will not bother you, Mr. Chairman, with the statistics regarding loaded cars received, etc. But I think it is of interest to the committee to know that, from the time we started at Hog Island until the present moment, with the weather conditions that they had there last winter, and the backing up of cars, etc., the total demurrage amounted to only $42,040. The total number of cars received was 49,593. In other words, I merely put that in because comment has been made that they had at Hog Island 1,300 cars backed clear to Kansas City, Mo., or some such place, and that Hog Island was responsible for all the freight congestion last winter. If that is true, our demurrage should certainly be more than $42,040.

And Mr. Levy states that since the 1st of last April, our total demurrage has been only about $1,000. I would like to have this statement as to loaded cars received inserted in the record.

(The statement referred to is here printed in full, as follows:)

(W-14-C.) JANUARY 28, 1919.

Statement of loaded cars received.

Month.	Cars received.	Average per day.	Demurrage charges.
1917.			
October	549	11	----------
November	1,755	58	$8,265
December	2,494	80	5,383
1918.			
January	3,399	110	22,148
February	4,178	149	1,799
March	4,205	136	3,515
April	4,006	134	30
May	4,330	140	150
June	3,869	129	18
July	4,553	147	12
August	3,914	126	18
September	3,630	121	----------
October	3,372	109	168
November	2,761	92	18
December	2,578	83	516
Total	49,593	108.5	42,040

From October, 1917, to February 1, 1918, demurrage rate was $2 to $5 per day after the first 48 hours. From February 1, 1918, to December 31, 1918, $3 to $10 per day.

On the old standard demurrage charges of $1 per day, which were superseded April 1, 1916, total demurrage payments would have been $11,850 instead of $42,040.

Since March, 1918, total demurrage paid on inbound shipments, $930, of which $624 will be collected from contractors and others, leaving $306 due to fault of A. I. S. C. for a period of nine months, an average of $34 per month, or slightly in excess of $1 per calendar day.

This demonstrates the original plan contemplated adequate facilities at Hog Island for releasing loaded cars.

Demurrage prior to March 1, 1918, due to weather conditions, delay in material for constructing railroad tracks for unloading other cars, and to conditions in general, resulting from starting such huge operation from zero and attempting to rush during very severe winter weather. Also to accumulating large amount of construction material which was used to good advantage when weather broke.

I should like also to have inserted this statement with regard to trolley lines, steam, and boat transportation.

(The statement referred to is here printed in full, as follows:)

(W-9.) JANUARY 26, 1919.

TROLLEY LINES, STEAM, AND BOAT TRANSPORTATION.

On July 15, 1918, the Southwestern Trolley Line started operation to Hog Island.

On August 4, 1918, the Philadelphia Rapid Transit Co. started operation to Hog Island.

Prior to July 15, 1918, and August 4, 1918, the only trolley transportation to the island was P. R. T. Chester Short Line at approximately Ninety-fourth and Eastwick Avenue, about 1¼ miles from the shipyard.

About January, 1918, A. I. S. C. built double track shuttle line between shipyard and Ninety-fourth and Eastwick Avenue, and provided steam shuttle service between Hog Island and Ninety-fourth Street and Eastwick Avenue, connecting with trolley lines.

Total number of people transported to and from Hog Island from Nov. 1, 1917, to Dec. 31, 1918, a period of 14 months	12,491,000
Average number of passengers transported to and from Hog Island per day during month of September, 1918:	
Steam roads	9,661
Philadelphia Rapid Transit electric	25,112
Southwestern electric	8,443
Boat	1,650
Total	44,866

GENERAL INFORMATION COVERING TRANSPORTATION LINES.

Southwestern Line.

Distance from Hog Island to Third and Jackson Streets (end of line)—miles	6.67
Number of cars transporting passengers on this line—cars	50
Number of feet of new construction necessary to reach Hog Island (Penrose Ferry to Hog Island):	
Single track	15,100
Double track	30,200
Sidings and turnouts	3,831
Total amount of money advanced by E. F. C. for purchase of cars, etc	$942,000

Philadelphia Rapid Transit Co.

Distance from Hog Island to Fortieth and Market Streets (end of line)—miles	8.09
Number of cars transporting passengers on this line	100

Number of feet of new construction necessary to reach Hog Island (Eastwick Avenue and Island Road to Hog Island):	
Single track	15,268
Double track	30,536
Total amount of money advanced by E. F. C. for purchase of cars, etc	$1,850,000

Philadelphia & Reading Railway (steam line).

Number of trains run to and from Hog Island:	
Wayne Junction	3
Thirty-first Street and Girard Avenue	3
Forty-ninth Street	1
Total	7
Average number of cars in each train	11
Track feet of new construction necessary to reach Hog Island (connection between P. & R. Chester branch at Ninetieth Street and A. I. S. C. Shuttle Line at Ninety-fourth Street)	528

Pennsylvania Railroad (steam line).

Number of trains run to and from Hog Island:	
Broad and Washington Avenue	3
Average number of cars in each train	11
Track feet of new construction necessary to reach Hog Island (Sixtieth Street line connecting with Maryland division of P. R. R. at Fifty-eighth Street, and Fort Mifflin branch P. R. R. at Hog Island):	
Single track	19,000
Double track	38,000

Boats.

Largest number of boats used in any one month	4
Average rate of fare—cents	10
Average distance covered between Hog Island and starting point—miles	7

Rate of fare on steam and trolley lines.

	12 rides.	1 ride.
		Cents.
Pennsylvania R. R.—Broad and Washington Avenue	$1.25	10.4
Philadelphia & Reading Ry.:		
Wayne Junction	1.65	13.7
Thirty-first Street and Girard Avenue	1.22	10.2
Forty-ninth Street	1.20	10
Trolley lines:		
Philadelphia Rapid Transit	.....	10
Southwestern	.....	5

Mr. BRUSH. That statement shows, among other things, that the total number of people transported to and from Hog Island from November 1, 1917, to December 31, 1918, was 12,491,000.

The CHAIRMAN. That is all charged up against the construction account, is it not?

Mr. BRUSH. Those, Mr. Chairman, are the men going to and from the city, and paying their fare on the trolleys and on the steam railroads. There is some charge against Hog Island for that, representing certain transportation expenses we absorbed in the early stages of the work, with the full approval of the Fleet Corporation.

The CHAIRMAN. You do not mean that the men paid their own fare out of their pockets, do you?

Mr. BRUSH. Yes; to and from the plant. We absorbed certain excesses over the amount of the fares paid by the men.

The CHAIRMAN. Did they not get reimbursed for the cost?

Mr. BRUSH. No, sir.

The CHAIRMAN. It came out of their pay, did it?

Mr. BRUSH. Yes, Senator.

Senator VARDAMAN. What was the testimony on that here the other day? It was different from what Mr. Brush says.

Mr. BRUSH. Do you know of any instance where the company paid their fare, Mr. Levy?

The CHAIRMAN. Yes; I think they did that at one time.

Senator VARDAMAN. Somebody testified before the committee the other day as to the amount the Government paid and gave it as a very considerable sum.

Mr. BRUSH. Mr. Chairman, Mr. Levy tells me that we have some figures on this with us and that the Fleet Corporation approved of our company absorbing all of some transportation charges for the men and a portion of other transportaion charges over and above what the shipworkers paid for transportation to and from their work; in fact, he tells me that the award of the Macy Board of February 14, 1918, specifically authorizes this. It seems that some free trains for yard laborers have been run to the island on the approval of the Fleet Corporation, and when the workers are forced to pay more than 10 cents to and from the island and the destination of the train or boat they ride on, the excess is absorbed by the shipyard, and on one trolley line serving the island, which line is being operated by the Fleet Corporation, the men pay 5 cents for each ride and we pay the trolley line 5 cents for every one of our workers they carry. Also we operate a shuttle steam train between Hog Island and Ninety-fourth and Tinicum Avenue connecting with the Chester Short Line trolley line of the Philadelphia Rapid Transit Co. Since the job started our expenses for transportation of workers as I have outlined amounts to approximately $499,931.60 divided as follows:

Philadelphia & Reading	$124,139.87
Pennsylvania R. R.	154,990.82
Steamboats	124,906.09
Expense of operating shuttle trains (estimated)	74,374.36
Difference between cost of railroad tickets purchased in October, November, and December, 1917, and amount collected from employees	21,520.46
Total	499,931.60

On considering these figures it must be remembered that at the time we commenced work there were practically no transportation facilities at all and some adequate arrangements had to be made and quick, too, to provide reasonable transportation for the workmen.

There is one other statement I want to put in. I want to put in a record of the surgical, medical and sanitary situation at Hog Island, which I think is perfectly remarkable. We never have had any epidemics of contagious diseases there; we have never had malaria [knocking the wooden table], typhoid, and anything of that character there which has injured us in connection with the work ex-

cept the influenza, and the influenza last fall did put a lot of the men out of commission.

Senator VARDAMAN. Have you had any influenza there?

Mr. BRUSH. Very much; it was all through Philadelphia.

Senator VARDAMAN. Somebody testified before the committee that that was the reason why you did not build any ships.

Mr. BRUSH. I do not know about that. I know the influenza set them back last year about two months. I think that is a perfectly fair statement. And I think this medical statement should go into the record.

The CHAIRMAN. Very well.

(The statement referred to is here printed in full, as follows:)

"W-5"

JANUARY 27, 1919.

SURGICAL, MEDICAL, AND SANITARY DEPARTMENTS.

[Organized Nov. 15, 1917.]

Functions: Surgical, medical, dental, sanitary.

Hospitals: Surgical, medical, 5 first-aid stations on ways and wet basins.

Equipment. Surgical hospital: Complete general operating room; completely equipped surgical wards, 2; beds, 28; first-aid room for walking patients, 1; modern X-ray department, 1; special room for eye, ear, nose, and throat, 1; hydrotherapeutic room for heat strokes and sunstrokes, 1; completely equipped redressing room, 1; complete dental clinic, 1; ambulances, 3.

Character of equipment: All equipment is modern and ample.

Results: There have been no complaints as to maltreatment or the lack of prompt surgical assistance.

Base hospital: Contract with Misericordia Hospital in West Philadelphia.

Statistics.

Fourteen months in operation.	
Surgical cases treated (major and minor)	58,333
No fatalities resulting from surgical infection or blood poisoning. Not one single case of lockjaw, notwithstanding low, swampy land and heavy humidity.	
Time-losing accidents (1 day or more), 3.75 per cent	2,193
Medical hospital: Capacity (beds)	50
Medical dispensary: Cases treated	12,118
Equipment: Modern.	
Hospital cases	1,570
Average number of beds occupied daily	32
Hospital cases (city)	100
Cases handled during recent epidemic	3,000

Statistics—Hospital.

Ambulance trips on Island to emergency hospital	4,226
Ambulance trips from emergency hospital to Philadelphia	1,031
Total	5,257
Dental patients treated	6,496
Eye cases treated	14,060
X-ray plates taken	16,200
Fatalities:	
Accidents in course of employment	54
Accidents other than in course of employment	16
Natural causes	6
	76

DEPARTMENT OF SANITATION.

Functions: All functions of a board of health of a modern municipality. Inspection and control of water supply, sewage disposal, food, housing, live tock, fumigation and disinfection, physical examination, inspection, and con- rol of laboratory.

Information: The department of sanitation has directed and conducted the ost successful mosquito and antimalaria campaign ever conducted in the tate of Pennsylvania.

This department has controlled the purification and delivery of drinking ater from the Delaware River at the point of its highest pollution to an indus- rial population of over 30,000 without a record of a single case of typhoid ever or other water-borne disease.

The mosquito and fly campaign was not confined to Hog Island alone, but xtended to all surrounding territory equal to three times the area of Hog sland.

Mr. BRUSH. I think it is a credit to the medical profession of the nited States for those doctors and surgeons in charge of that work o have done what they have done—to do away with mosquitoes and lies and drain that entire 846 acres and also drain and put in a sani- tary condition an area of three times the size of the shipyard to pro- tect the ship workers. The milk is tested every day and the food is tested every day and the water is tested. As a matter of actual fact, we take water out of the Delaware River and treat it and use it for all purposes on the island, and so treat it again after we are through with it, as sewage, that when we put it back into the Delaware River it is in better condition than it was in the first place. And that is not my opinion; it is the statement of the officials of our sanitary department.

Now, I do not want to take your time, Mr. Chairman, but I be- lieve there should go into your record some of this information we have compiled, on which there is a very radical difference of opinion, as to whether this institution was, for the Government and under the direction of the Government, an asset to you during the war, en- tirely aside from the number of ships produced. I have before me a clipping from the New York Tribune——

Senator VARDAMAN (interposing). That is a mere matter of opin- ion. The facts that you put in here can speak for themselves, and the people who have studied the matter can draw their own conclusions, and it is not necessary to cumber the record with newspaper clippings.

Mr. BRUSH. I do not propose to put in newspaper clippings. But we have the statements here from some of the most prominent men in the world who have visited Hog Island; and this book [indi- cating] is made up of statements of those men; it is made up of state- ments by such men as Lord Reading——

Senator RANSDELL (interposing). I think it would be important to put that in.

Senator VARDAMAN. I have no objection to that.

The CHAIRMAN. Not newspaper clippings, but the statements of Lord Reading and other men of that kind, if you have them; they can be inserted in the record.

Mr. BRUSH. I will not put newspaper clippings in.

Instead of doing that, I will go through this book and leave out a number that I think would not be of substantial interest to you; but I do believe there is some very interesting data here, especially if a man raises a question as to whether or not Hog Island should have

been built, and as to whether it should have been used, especially from a propaganda standpoint.

Senator RANSDELL. I think that would be especially interesting, especially if you can get those statements from prominent men who live in shipbuilding countries.

Mr. BRUSH. Yes.

Senator RANSDELL. I suppose you have some from Great Britain, Norway, and Japan.

Mr. KNIGHT. From nearly every nation.

Mr. BRUSH. Yes; and not only from those nations, but from men who are vitally interested in shipbuilding in those nations.

Senator RANSDELL. Yes.

Mr. BRUSH. I think one of the problems with which Hog Island has been confronted has been the fact that Hog Island has been used for the past 16 months as an advertisement for the United States Government as to what it could do and was going to do in the building of ships, and that probably Hog Island, if it had not had any more publicity than any of the other shipyards on the Delaware River or on the Atlantic or Pacific coast, would not have had a great deal of the unfortunate publicity that it has had.

But Hog Island has been deliberately advertised by the United States Government representatives.

I have here a statement from a representative of the consular service of our country in foreign countries where they have undertaken to make clear to our allies that the United States was in the war to the finish, and that we intended to build ships, and to build ships as promptly and as efficiently as we could, and, naturally, Hog Island has received a tremendous amount of advertising.

Senator RANSDELL. You have statements there that indicate that, have you?

Mr. BRUSH. Yes.

Senator RANSDELL. I would like to know about that; I would like to know about the psychological effect of the building of Hog Island.

The CHAIRMAN. You need not cumber the record, but you can put in enough material to show what the moral effect of the construction of Hog Island has been, the opinions of prominent men in different countries about it, and so on.

Mr. BRUSH. I will do so, thank you, Mr. Chairman.

Advantage was taken of these expressions of opinion, coming as they did from prominent officials and citizens of this and other countries, to use them in the yard and in the Hog Island local paper to keep before the men the great importance with which the Hog Island project has been and is regarded, not only in this country but in the allied and other foreign countries.

(The letters, statements, and other material submitted by Mr. Brush in response to the request of Senator Ransdell are here printed in full, as follows:)

President Wilson, after attending the launching of the *Quistconck* on August 5, 1918, said:

"I think the best thing to say about Hog Island is to admire it and say nothing. I thank you all for the reception you have given Mrs. Wilson and myself. We have been working very hard at Washington and I can see that you have been doing the same here. What I have seen at Hog Island is wonderful."

Chairman Hurley cabled Gen. Pershing June 26, 1918:

"Not by delaying a single ship, but by speeding to the utmost, the American hipyards will launch nearly 100 ships July 4. On this day, celebrating the 'ation's independence and backing up boys in the trenches, the men in the hipyards will launch 450,000 deadweight tons—as much as was launched in ix months last year. Your inspiring leadership of the American Army in 'rance has thrilled the shipyard workers, and, if the time comes when you eed even the shipyard men over there, they will go to the last man. We 'ant you and the boys in the trenches to know that the men in the yards are oing the limit to provide in record-breaking time the ships that will carry ıore men, food, and munitions to the intrepid American Expeditionary Forces. . cablegram from you, to be read in the shipyards July 4, will arouse ıcreased enthusiasm."

Gen. Pershing cabled Chairman Hurley July 4, 1918:

"The launching of 100 ships on the Fourth of July is the most inspiring news hat has come to us. All ranks of the Army in France send their congratu-ıtions and heartfelt thanks to their patriotic brothers in the shipyards at ome. No more defiant answer could be given to the enemy's challenge. With uch backing, we can not fail to win. All hail, American shipbuilders."

Gen. Pershing, on September 18, 1918, sent this cable of appreciation to Iog Island:

"Many thanks for your birthday cable, which is deeply appreciated. The ıews of the continual speeding up of America's shipbuilding makes us more ·onfident of victory. My hearty congratulations to you and to the workers)f the Hog Island shipyard."

The three foregoing cables were conspicuously posted through the entire Hog Island yard.

William S. Sims, admiral, United States Navy, on September 17, 1918, wrote to a Hog Island foreman as follows:

"The Hog Island achievement has attracted attention all over the world, and the production is well known over here, as it is in America. We all feel that the success of the allied cause depends primarily upon the success of works of this kind."

Admiral Sims' letter was also posted throughout the yard.

Mr. Charles M. Schwab, director general, Emergency Fleet Corporation, after visiting Hog Island on April 27, 1918, soon after he had taken his office, said:

"I was delighted at the progress made at Hog Island. It is one of the largest operations I have ever seen. I am exceedingly optimistic about the work and know I will not be disappointed. I only ask the people to have patience and I know they will be rewarded."

Hon. William C. Redfield, Secretary Department of Commerce, on July 6, 1918, said:

"I was much impressed with the magnitude of the operations, and it gives promise of working a wonderful change not only in this country but throughout the world. It embodied the principles I had long hoped for."

Hon. John Skelton Williams, Comptroller of Currency, on June 26, 1918, said:

"The work which has been accomplished on those 800 acres of land since September last is illustrative of what America can do in this great industrial age."

Lord Reading, Lord Chief Justice of England, and Great Britain's special ambassador to the United States, visited Hog Island June 1, 1918. In his party were Maj. John E. D. Swinton, inventor of the famous "tanks"; Maj. Caraufurd Stewart of the ambassador's staff; Sir Henry Babbington Smith, of the ambassador's staff, Assistant British High Commissioner; Sir Thomas Boyden Brett, commissioner of shipping, and Sir Richard Crawford, commercial advisor to the embassy. Lord Reading said:

"You are behind our generals creating a war machine that is nothing short of staggering. It is largely upon this machine of war which you are now building that I am founding my hopes of a blow that will strike terrifically at the ambitions of Germany. It is wonderful, wonderful. You Americans, when you wake up to things, create something that produces with tremendous rapidity.

"This is an astonishing undertaking. I am certainly impressed with the largest amount of construction work accomplished at Hog Island in such a short space of time. If you continue to go along as fast as you are going at present, you will go a long way toward solving the submarine problem."

Maj. Gen. Swinton, inventor of the British "tanks," when he visited Hog Island June 18, 1918, said:

"Hog Island is marvelous, but you must realize that when a Nation with the resources of this one sets out under the strain of war to build anything, it is only natural that one of the greatest plants in the world should result."

Sir James McKenzie, F. R. C. S., of England, Sir Williams Arbuthnot Lane, noted British surgeons, and Col. Herbert Alexander Bruce, of Toronto, Canada, saw the Hog Island plant June 24, 1918. Sir James McKenzie said:

"British authorities have no conception of what has been done. I am amazed at the progress and I am sure every other Englishman would be if he could only see it."

P. H. Wilson, correspondent of the London Daily News, and former member of Parliament, on February 23, 1918, said:

"We are immensely impressed with the magnitude of the preparation; also with the wonderful organizing efficiency of what we have seen."

C. Maughan, representative of the London Daily Times and British Admiralty, stated June 7, 1918, that he had traveled very extensively and had never seen anything that approached this undertaking in magnitude or in excellence of construction.

Right Rev. Bishop Gore, of Oxford, England, on November 21, 1918, said:

"It is the most wonderful sight I have ever seen. It is something every American ally should be proud of. It is something that can not be visualized until it has been seen."

British medical mission on November 5, 1918, consisting of Col. Sir Thomas Myles, Dublin; Maj. G. Gray Turner, Newcastle-on-Tyne, and Col. George E. Gask, London, saw the yard. Col. Myles wrote:

"It is really a wonderful work and nothing made a deeper impression on me than the visit to the great yard. Thank God the war is practically over, and let us hope very soon the good ships you are building will be carrying food and stores to starving Europe, no longer under the terrible menace of the cowardly U-boat."

Sir William Maxwell, of Calcutta, on July 2, 1918, said:

"Very much pleased and think it incredible that the work has been done in so short a time."

W. H. Merry, K. J. Patterson, F. Simonett, all from Australia, where they are general contractors, on May 30, 1918, said:

"They felt well repaid for stopping over to see Hog Island, as it was the greatest thing they had ever seen and, as they were contractors, they had some comprehension of the difficulties with which the work had to contend and that they had been overcome in a wonderful manner."

Lieut. Wiezbicki, of France, said after seeing the yard on June 10, 1918:

"This, Hog Island, is one of the two most important places in the world to-day. The other is the River Marne."

French High Commission, headed by Edouard de Billy, director general; Francois Monod, chief of cabinet; Charles J. Gillet; Henri-Martin Barzun, J. F. Lacombe, A. Rio, L. Nicol, Lieut. H. Marquisan visited Hog Island November 23, 1918.

"The members of the French commission were loud in their praises of the work at Hog Island, and spoke particularly of the psychological effect, of building this yard, on the allies. They also said that they thought it had the effect on Germany of making her realize more than anything else the wonderful resources of the United States of America."

Paris newspaper men: Monsieur J. de Marsillac, London correspondent of the Paris Le Journal and secretary of the Foreign Press Association, with other Paris newspaper men, visited the yard about August 22, 1918. Afterwards M. Marsillac said in his paper Le Journal, published in Paris:

"It is simply marvellous. I have been along the Thames and the Clyde and to practically all the shipyards in England and France, but there are none that equal the Hog Island yard, either in size or in the hustling spirit shown by the employees. Hog Island is, without a doubt, in the industrial domain, the most immense work that has ever been conceived and executed in the history of the world—in short, this whole enterprise is almost superhuman and is working irresistibly toward victory. The method is unbelievable in its simplicity, rapidity, and efficiency, when one considers that these parts which fit so exactly came from one or another of 3,500 fabricating shops, all contributing to this piece of construction. These were familiar methods of production in certain

ndustries such as the automobile industry, but they were unknown, and I may ay considered practically impossible for ship construction, contrary to all heories and all precedent, but an idea, which, fortunately for us, proved itself uccessful." (Translation.)

Commander Lèvdouerine, of the French technical mission, including Col. Mortmour, Capt. Noulton, and Lieut. Bertvier saw the yard October 8, 1918, ınd said:

"We are greatly surprised at the magnitude of what we have seen to-day. These facts are a great comfort to us. We will know in the thick of the battle America is with us."

Commander E. Davaux, referring to the visit of himself and Capt. J. Debry, of the French Navy commission, to Hog Island, wrote on November 9, 1918:

"They wish also to express their appreciation of the magnificent efforts made by the American International Shipbuilding Corporation and of the results obtained, which will so greatly help the American and allied Governments during the restoration period."

Jacques de Marsillac, special represenative of Le Journal, Paris, also wrote to his paper an article on Hog Island, of which the following is a translation:

"THE EIGHTH WONDER OF THE WORLD.

"PHILADELPHIA, *September, 1918.*

"In 1914 the largest shipyard in the world contained 15 ways, and had launched 150,000 tons in its best year. The shipyard of Hog Island, located near here and cradle of the 'fabricated' ship, has 50 shipways, and an annual productive capacity of 1,500,000 tons dead-weight. Comment is unnecessary; Hog Island is without a doubt, in the industrial domain, the most immense work which has ever been conceived and executed in the history of the world."

Then followed description of the entire project, going into the construction of the yard and of the ships, all at great length, concluding with, "In short, this whole enterprise is almost superhuman and is working irresistibly toward victory."

Article from Oui, published in Paris, November 16, 1918 [translation]:

"ARTICLE ON SHIPPING MATTERS—MORE SHIPS—SHIPS, SHIPS, SHIPS!

"This was the appeal of executive Americans in 1917.

"To-day, from the most powerful financier to the poorest citizen, from the engineer to the workman, from the inhabitants of the coast to the ranchmen of the central United States—everybody has heard and understood this patriotic appeal: Without the ships the war could not be won; without them no economic victory would be possible after peace. Every American knows this; and it is this little detail which constitutes to-day the strength and wealth of the United States. But this idea which consisted in impressing upon the consciousness of every person the necessity for tonnage was not easily accomplished, and it will not be without difficulty that it is inculcated in each of us in France.

"In 1914 the commercial fleet of the United States was about equal to that of France, about two-fifths of that of Germany, and one-tenth of that of the British Empire.

"In 1917, before the entry of America in the war, its tonnage of 2,500,000 was practically unchanged. In fact, at that time our allies did not attempt to carry an industry which foreigners could conduct more economically.

"At the time when, because of her entry into the war, America was pledged to furnish tonnage she had nothing; workmen, construction materials, shipways, equipment—in fact, everything had to be created.

* * * * * * *

"The patriotic fiber responded at once, the legendary American navigator aroused himself at once from his sleep of more than 50 years. And soon every American was acquainted with the necessity of the hour and offered spontaneously his assistance.

* * * * * * *

"More than 150 shipyards are building ships, the greater part of which, recently established, are still unfinished. The United States Shipping Board placed contracts for one or more ships with each one. Among the new shipyards the two most important have, respectively, contracts for 150 and 180 ships. The largest shipyard comprises 338 hectares (846 acres), of which 10 hectares

are under roof. The construction of this shipyard was decided upon on September 13, 1917, and was commenced seven days later.

* * * * * * *

"It is the shipyard of Hog Island, nonexistent the 20th of September, 1917.

* * * * * * *

"It is well to state that 3,500 different industrial establishments supply Hog Island.

* * * * * * *

"The result is such that the director of the Shipping Board, Mr. Hurley, has been able to state very recently: 'In 1920 the merchant marine of America will comprise 25,000,000 tons.'

"America will have increased her capacity ten times and have taken first place among the merchant marines of the world."

Domenica Gidoni, of Banco d'Italia and Institute Nazionale per I Cambi' con Lestero, Italy, after seeing the yard wrote on June 5, 1918:

"Extremely interesting and inspiring. The thing that interests me most is the organization task of it."

William Ruys, United States representative at Rotterdam, Lloyds, and Mr. Schilthuis, of Holland, visited the yard December 20, 1918. Mr. Ruys said:

"I see in Hog Island the upbuilding of the merchant marine of the United States. You have unlimited possibilities here."

Prince Axel Christian George of Denmark, together with Commander Johanes Korbling, Lieut. Commander F. W. Laub, and Lieut. Commander Andres Thiele, of the Danish Navy, visited the yard November 12, 1918. Prince Axel said:

"The Hog Island shipyard and terminal surpasses anything we ever dreamed of in Europe. It is a marvelous feat in engineering skill.

"The yard itself is the best reproof of any criticism."

Col. T. Yoshida, head of Japanese military mission, on March 29, 1918, said:

"We came, we saw, and were amazed; we never thought there was anything so big in the world. I am amazed at the size and the speed at which it was constructed."

Y. Tsutsumi, T. Moriyq, K. Inouye, K. Murakami, of Asamo & Co., Tokyo, Japan, on November 4, 1918, wrote:

"It was very fortunate indeed for us to have had such a great opportunity to see the wonderful shipbuilding plant at Hog Island. No other country, we think, other than the United States can launch such a great enterprise. It is *the* American enterprise, run under characteristic efficient American management."

U. Hashimoto, Y. Konishi, Y. Koshimura, T. Ohyma, and S. Tsunematsu, a group of Japanese business men, on June 20, 1918, made this comment:

"Were astounded at the size of the shipyard and expressed great satisfaction of the work which had been done.

"One of the Japanese said he did not believe there were 50 ways and counted them, and said there were not 50 ways in all Japan."

Twenty-three Mexican newspaper men, under the guidance of Lieut. Commander O'Reilly, came to the yard June 10, 1918.

Señor Enrique Manero, of El Economista, said: "Our breath was taken away. It was so much larger and so much more efficiently operated than anything in Mexico that it was hard for us to comprehend it."

Manuel Capio, editor and general manager of La Voz d'la Revolucion, said: "We had conveyed to us the enormous meaning of the work of shipbuilding, and we are already at work telling the people of Mexico, through the columns of the press, of the wonderful work. We will tell our stories so that the Mexican people may have the right impression of the intention of the United States in this war. * * * We are learning how to view the United States, and we are learning to rightly interpret the things we hear."

South American diplomats came on July 27, 1918—

Señor Varela, chargé d'affaires of Chile: "Colossal, grandiose. It is our hope that this is a starting piece of a greater friendship between the United States and South America."

Minister Calderon, of Bolivia: "I could not have believed it without seeing. It is vast. It means much to my country."

Minister Mendez, of Guatemala: "Tremendous, wonderful, gigantic."

Minister Menos, of Haiti: "Wonderful. Indeed, I could not have imagined it."

Minister Cespedes, of Cuba: "Marvelous from every aspect. I am thrilled y this thing, being, as I am, one of your allies. There is a great friendship nd solidarity between Cuba and the allies. We shall stand by you to the ast, sure of victory."

Minister Dominici, of Venezuela: "A wonder of industry and achievement, nd more than ever so considering the incredible fact that it was built in ess than a year."

L. E. Le Fevre said: "Gigantic. Of course, it reminded me of the Panama anal work just before completion, but Hog Island is simply stupendous."

Minister Ureueta, of Colombia: "Tremendous, fine."

Minister de Freyre, of Peru: "Extraordinarily fascinating."

Minister Galvan, of the Dominican Republic: "I am dazed by it. There ever was anything else like it. It is too big for words."

Señor de Pena, of Uruguay: "A wonderful achievement of American ingenuity."

Minister Lopez said: "Wonderful. Such enormous construction in such hort time. How can it be described?"

Royal Spanish naval commission, headed by Capt. F. de la Rocha, president, ncluding Marquis of Belmonte, Felix de Martino, and Miguel Bertran de Quintana, came to Hog Island October 9, 1918. They said: "Oh, it is tres nagnifique! It is grandiose! It is wonderful. I can not find words to say it."

T. J. N. Gatrell, of Peking, China, wrote on October 16, 1918:

"The copies of the Bridge of Ships reached me in good condition. I have distributed a number of these reprints among Chinese officials and in almost every case they have been acknowledged with expressions of thanks, and in one, with admiration for the 'Tremendous contribution to the cause of international liberty.'"

Hon. W. Cameron Forbes, ex-governor of the Philippine Islands, said on November 11, 1918, after seeing Hog Island:

"If you could not build this plant, then nobody could—but you have built it, and you have done a fine job. It's a shame that you couldn't be let alone so that you could have put all your energies on the construction work."

Frank Q. Brown, chairman Capital Issues Committee, said on June 26, 1918:

"It is a wonderful undertaking and deserves praise rather than condemnation."

Charles A. Morse, chairman Federal reserve bank, Boston, visited Hog Island June 26, 1918, and said:

"Hog Island is now such a famous place that no one can be said to have seen all the sights who has not been there, and I was very glad to have had the opportunity to visit it."

John A. Penton, publisher of the Iron Trade Review, Marine Review, and other technical journals, wrote after seeing Hog Island on October 21, 1918:

"The story of Hog Island is the most wonderful story of a constructive character in the entire war, as far as the United States is concerned."

Hog Island has been visited almost daily by visitors, both from our own country and from abroad. I mention particularly the following:

Newspaper men representing papers published in England, France, South America, Australia, and Scandinavia visited Hog Island on February 23, 1918, under the auspices of the United States Government.

In June, 1918, a Danish mission consisting of the former Danish consul of New York, the vice chairman of the Danish charter committee, and others, paid a visit to Hog Island.

On August 29, 1918, prominent citizens from Uruguay visited the yard, including Dr. Balterserbrun, minister of foreign affairs; Dr. Ceseare Merandi, vice president-elect, and others.

In September, 1918, Adrian Abraham, chief engineer of the Compagnie Generale Transatlantique, the great steamship concern in France, spent several days in going over the yard in detail and expressed his approval of the layout.

In October, 1918, British educational men, including the vice chancellor of the University of Cambridge, the vice chancellor of the University of Manchester, prominent members of the faculty of the University of Oxford, the University of Glasgow, and the University of Dublin, came to the yard.

In December, 1918, the yard was visited by a delegation of Scandinavian journalists, including C. J. Engstrom, Stockholm, Sweden; Valdmer Galster and Tage Halberstadt, Copenhagen, Denmark; Sigurd Konstadt, Christiania, Norway; Otto Johansson, Stockholm, Sweden; Herman Kr. Lohmkuhl, Christiania,

Norway; C. Emil Marott, Odense, Denmark; Erik Palm, Linkoping, Sweden; Arthur Ratche, Vilhelm Tvedt, and Jacob Vidnes, Christiana, Norway; Anders Vigon, Copenhagen, Denmark. They stated that they were surprised at the size of the undertaking, and that there were few cities in Norway and Sweden that had a population as big as Hog Island.

A delegation from the Tokyo Chamber of Commerce came to the island in December, 1918.

Mr. BRUSH. In addition to the above we have in our files a great volume of testimonials of every character from representative men from all over the world who have visited the plant and spoken most favorably of it. This is particularly true of representatives of our allies in the war, who were practically unanimous in their expression of opinion that, regardless of the output in ships from the plant, the effect upon the citizens of the allied countries was most encouraging and had a tremendous effect in keeping up their morale.

It was also generally felt by those who saw the stupendous magnitude of the work, indicative of the determination of the United States to prosecute the war to a finish and to absolutely overcome the German submarine menace, that unquestionably it was having a very detrimental effect on the maintenance of German morale.

As a further evidence of the fact that Hog Island was a matter of concern to our enemies during the war, we found it necessary to maintain a very comprehensive and high-grade guard system, consisting of 1 major, 17 commissioned officers, 89 noncommissioned officers, 411 privates, and 27 civilians, a total force of guards of 545, which force was reduced to 227 immediately upon the signing of the armistice. The guards were all armed with military equipment consisting of 800 rifles (Krag-Jörgensen), 100 revolvers, 3 machine guns, 25 blackjacks, 597 batons, 38 handcuffs, and 700 whistles.

In addition to this a thorough water patrol along the water front in front of the wet basin and ways was maintained, as well as a jail on the island.

There was also a mounted detail consisting of 50 officers and enlisted men with 56 horses, all of which was reduced immediately upon the signing of the armistice.

A total number of 16,433 cases and investigations were handled during the year, or an average of 45 per day. This number included special cases for the Department of Justice, Military and Naval Intelligence Bureau, American Protective League, and for the police departments in other cities. Many of the cases were disposed of by the United States court at Philadelphia.

The department proved of assistance to the Government in the enforcement of the "draft," as well as the laws concerning alien enemies, in evidence of which 433 draft delinquents were turned over to the Department of Justice and 254 alien enemies were either turned over to the same department or escorted from the island.

As an evidence that shipyards in this country were a matter of concern to the enemy of which we were conscious and governed ourselves accordingly, the following clipping from the New York Tribune of Sunday, January 12, 1919, is submitted:

"Peter Zwaay, a young Hollander who entered this country last summer on a Dutch transport bearing the name of Johannes Leonidas Titus van Haren, was held in $5,000 bail yesterday by the United States Commissioner Hitchcock, for violation of the espionage act, after he had acknowledged that he was

a secret agent of the German Government working under direction of Aptroot, the master Hun spy in Holland.

"According to Lawrence Axman, Federal prosecutor, Zwaay confessed to the naval authorities that he was sent to this country by Aptroot, who had headquarters at Rotterdam, to convey information to Holland on troop movements. He was instructed to keep track of the movements of the *Leviathan*, but in his statement to Ensign John J. Glynn, he said he had not sent back any information. He turned over to the authorities a secret code, and explained that he had been ordered to write his message in iodine, with some simple and innocent sort of communication on the same paper in ordinary ink.

"Mr. Axman said that since Zwaay landed in this country he had been working in the Newark shipyards under the name of Van Haren. Before being sent on the mission to America he was in England for some time in the pay of Germany. While here, he explained, he sent many messages to the Germans because he was being well paid, but insisted that they contained no information of value.

"Zwaay was taken in custody after he had applied to the Dutch consul for a passport to return home. The matter was taken up with the Federal authorities, who recalled having been warned to look out for a sailor with an anchor and star and the letters 'P. Z.' tatooed on his arm and hand. When these marks were found on Zwaay he confessed.

"In default of surety he was committed to the Tombs."

Mr. BRUSH. Now, Mr. Chairman, if I may, in closing, I should like to say this:

I think it might be of interest to you, in trying to conceive of just what Hog Island is, and what it means, to have some comparisons in your records with such institutions as the Panama Canal and some of the other very large pieces of engineering work that have been done in recent years, together with the estimates that have been made, and the actual expenses.

The Panama Canal, which was originally estimated to cost about $145,000,000, finally cost approximately $435,000,000. It was estimated that the work would be done in 2½ years; in fact, it took about 9 years, notwithstanding the fact that they had been surveying it for 15 or 20 years—the French Government and our Government.

In this immediate vicinity, here in Washington, the War Department estimated that the Virginia Bridge would cost in June, 1915, $1,000,000; and in January, 1918, it was estimated to cost $2,100,000, to be completed in 1921; and the cost will actually exceed the last estimate.

The Kansas City Terminal Railway, which was originally estimated to cost $30,000,000, they have spent over $50,000,000 up to date.

Senator VARDAMAN. All of which goes to show the fallibility of human judgment.

Mr. BRUSH. Yes, sir. Senator Vardaman, I should like to insert a memorandum with regard to the cost of the completion of the Panama Canal.

The CHAIRMAN. All right, that may be inserted.

(The statement referred to is here printed in full as follows:)

(W-2.) JANUARY 27, 1919.

PANAMA CANAL.

From May, 1904, to September, 1905 (16 months), the American Government had force of engineers making preparatory studies or plans. In September, 1905, meeting was held to discuss these plans and later it was decided to start work of preparing detailed plans in August, 1906, which plans were completed in March, 1907. Actual construction work commenced March, 1907. Canal completed March, 1914. Opened to traffic August 15, 1914. Officially opened January, 1915.

Preparation	2 years 3 months.
Detail plans	7 months.
Planning period	2 years 10 months.
Construction period	7 years.
Total	9 years 10 months.
Final cost	$435,000,000
Original estimate	145,000,000
Excess over estimate	290,000,000

(Actual cost three times the original estimate.)
(Authority, A. I. S. C., Washington office.)

Mr. BRUSH. If I may I should like to read into the record a statement which Mr. Piez made before this committee on January 2, 1919. Quoting from his letter of September 25, 1918, to Chairman Hurley, commenting on some comparisons of costs of the three agency plants made in the Attorney General's report:

A careful review of both the figures and all of the attendant circumstances prompts the suggestion that it would be very unwise, if not unfair, to deduce from the differences in cost per way that Hog Island was not as economically constructed as either of the other two plants. I doubt very much if, with the advance in labor costs, Hog Island could be reproduced to-day, even under more favorable weather conditions, at any less. And, above all, it must be remembered that Hog Island presents an opportunity for salvage value as a shipping and railroad terminal that far exceeds that of either of the other two plants. Newark Bay is on leased land, and must eventually be disposed of at scrap value, and the location of the Bristol yard holds out no great promise for continued usefulness upon the return of keenly competitive conditions. Its salvage value will be seriously affected by this fact.

In closing, Mr. Chairman, I should like to say this: I do wish you would do one thing for me after I am through; I do wish you would, for my satisfaction, or if Senator Johnson is here, he has been particularly interested in this: I would like you to put on the stand a man who has been on the *Quistconck*. I want to stop, once for all, this talk of the *Quistconck* sinking at the dock and being put in drydock, etc. Any statement to that effect is absolutely untrue; and I would appreciate it if you would examine the man who has been in the engine room of the *Quistconck* from the time she was delivered——

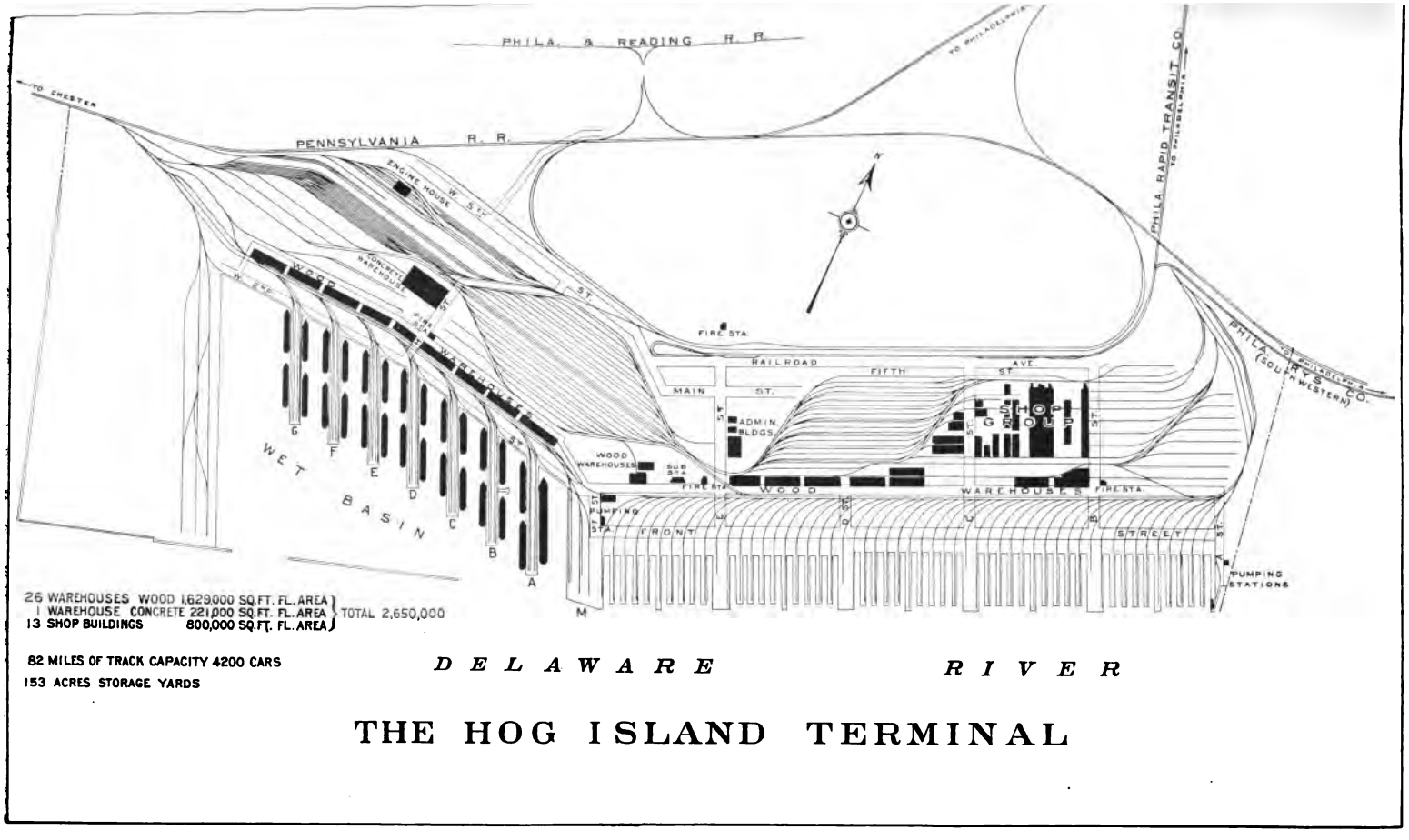
Senator RANSDELL (interposing). What is his name?

Mr. BRUSH. Mr. Walker C. Pierce. He is present now.

The CHAIRMAN. The same kind of stories have been told about the wooden ships.

Mr. BRUSH. I would like to make clear to you that it can be proved to your satisfaction that Hog Island is one of the marked exceptions, in the entire war program, in this respect; that its building will be entirely justified as a terminal, aside from its shipbuilding facilities. Hog Island to-day, I believe, occupies the position of being as good a salt-water terminal or coast terminal as any in the United States. And I have had the map drawn here [see illustration, p. 393] of Hog Island, which is a map of nothing on earth except that which is there at this minute. The terminal exists; and if the United States Government wants to commence using it to-morrow morning as a terminal it can do so.

Let me mention a few facts in regard to this plant as a terminal. The 26 wooden warehouses and the large concrete warehouse were



THE HOG ISLAND TERMINAL

"W-59" THE HOG ISLAND TERMINAL.

designed so that they would be available as storage houses in a terminal scheme. Each warehouse is served by a railroad track for the entire length of the house and each warehouse has a platform adjoining a street for its entire length. In other words, each warehouse is available for its entire length to the railroad, to teams, and to trucks on opposite sides of the house.

The 25 miles of railroad track serves the 148 acres of steel, machinery, and outfitting storage yards, and was designed to be available for the storage of any material that could be stored in the open.

The steam-railroad tracks are constructed on a maximum of 104-foot centers, on which we operate locomotive cranes equipped with 50-foot booms. In other words, every square foot of the space in our storage yards between the railroad tracks can be reached with a locomotive crane. I mention this as an indication to you that the storage yards are equipped to handle with self-propelled mechanical lifting apparatus heavy and bulky material at the minimum expense.

In designing our seven outfitting piers we placed two standard steam-railroad tracks on each side of the pier with double crossovers between each two tracks about the center of the pier; these two tracks serve every ship at the wet-basin piers, which helps us in the speed of outfitting our ships, and is very desirable when the piers are used as commercial piers in that the track on the outside of the pier can be used for flat cars containing heavy bulky material and the freight on that track is within reach of the ship's tackle. On the inside track can be placed box cars containing freight which must be unloaded on the pier, and freight unloaded from box cars on the water side of this track is within reach of the ship's tackle.

Each of the seven piers is equipped with four self-propelling gantry cranes running on a wide-gauge railroad track, which spans the outside railroad track on each side of each pier. The clearance under this gantry crane is sufficient to permit the operation of standard locomotives and cars. In other words, locomotives and cars can be run under the gantry cranes and the gantry cranes can propel themselves over the locomotives and cars. Each of these gantry cranes is equipped with booms 50 to 70 feet in length. In addition each of the piers is equipped with two self-propelling locomotive cranes, and Pier B is equipped on the east side with a bridge crane with a span of 118 feet, and 111-foot clearance from mean low tide with a lifting capacity of 100 tons, which is used for placing the turbines and reduction gears in the ships immediately after they are launched. The same crane is admirable for placing locomotives and other heavy articles in the holds of vessels.

Each of the piers is piped for high pressure water for fire protection and domestic water for drinking purposes, electric lines for both light and power and compressed air lines.

Wooden warehouses are equipped with brick fire walls every 80 feet, with hose reels and portable fire extinguishers for fire protection and electric lights.

The storage yards are wired for electric light and piped for water and air.

In fact, gentlemen, summing up I have no hesitancy in stating to you as a positive fact that there does not exist at any commer-

cial port in the United States any better equipped storage yards and storage houses or piers for commercial purposes. In fact, I make the statement without hesitancy that at no other commercial piers in the United States does there exist to-day 50 per cent of the modern appliances for the handling of cargo and the quick dispatch of vessels with economy and speed that is at this minute available and in actual operation at Hog Island with all details so thoroughly and painstakingly thought out and provided for.

Vice President Howard Coonley of the United States Shipping Board Emergency Fleet Corporation has made a statement that he believes Philadelphia ought to spend $100,000,000 for a terminal. Now, if they bought this terminal for just exactly what it cost the Government—$66,000,000—which would be a long way from the $100,000,000——

Senator RANSDELL (interposing). Do you mean to say that it is worth anything like $100,000,000 as a commercial terminal?

Mr. BRUSH. I believe Hog Island is worth more at this moment than the United States has invested in it, as a terminal.

Senator RANSDELL. As a commercial terminal for the city of Philadelphia?

Mr. BRUSH. Yes; and I believe that Hog Island is the one war venture that has taken place during this war, where every single penny that was spent by the Government can be recovered. I am thinking about T. N. T. that is being dumped into the sea or taken out to Arizona to be stored, and the millions of dollars spent on gas masks, harness, saddles, leather goods, and all of those things that are wasted—legitimately wasted, of course, because all of these were war investments. But you are fortunate in having made a war investment at Hog Island, which was well enough designed and built in a sufficiently substantial manner to become a substantial first-class, high grade commercial terminal after the war is over.

Senator RANSDELL. Do you mean that if we wanted to junk all these ways at Hog Island, the terminal there would be worth more than the whole thing cost?

Mr. BRUSH. I believe that firmly.

Senator RANSDELL. Is that the opinion of Mr. Howard Coonley?

Mr. BRUSH. I believe that is the opinion of Mr. Howard Coonley. He says he believes Philadelphia could afford to spend $100,000,000 to have a proper terminal. That [see illustration, p. 393] is a picture of Hog Island as it is this afternoon; those docks are all there.

I would like to insert Mr. Coonley's statement in the record at this point.

The CHAIRMAN. All right, Mr. Coonley's statement may be inserted.

(The statement referred to is here printed in full as follows:)

[The Philadelphia Press, Nov. 9, 1918.]

URGES HOG ISLAND SITE FOR GREATEST PORT IN THE WORLD—HOWARD COONLEY ADVISES PURCHASE OF SHIPYARD AFTER BUILDING PROGRAM IS COMPLETED—ROOM FOR 50 PIERS—CITY, STATE, AND BUSINESS MEN MAY FLOAT $100,000,000 BOND ISSUE FOR PROJECT.

Howard Coonley, vice president of the Emergency Fleet Corporation, declared yesterday that the business men of Pennsylvania, by the purchase of Hog Island following the ending of shipbuilding there and the floating of a

$100,000,000 bond issue by the city and State can transform the Philadelphia district into a mammoth port second to none in the world.

Mr. Coonley's statement came shortly after it had been learned that several maritime companies, including one trans-Atlantic concern, now using other ports are seeking dock facilities in this city.

"Hog Island is the ideal location for a great port," said Mr. Coonley. "It has a great deal of room for development and 50 piers could easily be constructed in this one spot. At present Hog Island has seven piers which could be utilized for port facilities as soon as the present shipbuilding program is finished."

In suggesting the raising of $100,000,000 by a bond issue Mr. Coonley said that this vast sum could not only be spent for the purchase and equipment of Hog Island, but that it could be used to build up the whole Philadelphia port industry.

"Hog Island," he said, "can be made the nucleus for the great port because it is so ideally located. There are ample trackage facilities at the yard at the present time which connect with the great rail centers. These can be added to with the building of additional piers until not only Hog Island but the entire Delaware River front will be one great center of maritime activity where ships from every part of the globe can load and discharge their cargos.

"Huge warehouses would have to be built to take care of the great ship cargoes. In addition, mighty cranes and other equipment would have to be constructed, while it would undoubtedly be necessary to construct additional railroad spurs connecting with the main lines of the various railroads."

Mr. Coonley emphasized the need for immediate action on the part of Philadelphia's business men because of the likelihood that advantages of other ports might be considered before that of Philadelphia if there was delay. He suggested that the business interests of the city and State immediately form an organization by which surveys may be made to determine existing facilities in and around this city for the starting of the enterprise.

Senator RANSDELL. Those [see illustration, p. 393] are the piers, are they?

Mr. BRUSH. Those are the piers; and that is where the dredging came in.

Senator RANSDELL. Each pier would hold four ships, would it?

Mr. BRUSH. Yes, sir; except that I have put in there [indicating] a 20,000-ton ship, 800 feet long; and I have put in there [indicating] two ships of 8,000 tons, 448 feet long; and at the rest of the piers I have put in 7,500-ton ships.

Here are 26 wooden warehouses. There [indicating] is as fine and as perfect a warehouse as exists on the face of the globe; it is of concrete, 172 feet wide, and 400 feet long, with this railroad track [indicating] running through it. It is absolutely fireproof.

Here [indicating] is as fine a steam railroad terminal as there is anywhere I know of.

Here [indicating] are your bank building, record building, your telephone building, your fire stations, your electrical substation, and so on.

Senator RANSDELL. I have understood that the space between those piers was too narrow to allow them to be used for commercial purposes. Is there anything in that statement?

Mr. BRUSH. No, sir! there is nothing in that statement.

The CHAIRMAN. Do you mean to say that you could accommodate four ships to each pier?

Mr. BRUSH. Yes, sir; we have 266 feet of clear water space between each pier, and, of course, with this much space you can place two of any size ship that sails between each pier; we have four lying at that pier right at this moment. We have 10 of those ships at those three piers. What I want to say is that this is available to meet a wartime need for terminals, if you are going to have a war; or in time of peace, it is valuable as a terminal for your merchant marine—and

you have every argument as to what ought to be done on account of the experience in New York as a shipping terminal.

Now, here at Hog Island, that land we own; you have an option on it for the exact amount that we paid for it. At the time the contract was signed, an option was given to the Government to buy that land and take it off our hands, at exactly the price we paid for it. And afterwards Mr. Whipple told the Emergency Fleet Corporation that the option was not valid, because the Government did not have a right to buy land at that time; therefore, the option was not legal. And they came to us and told us so; and we said to them, "Our intention was that you should have that option;" and so we executed another option to them. When was that, Mr. Knight?

Mr. KNIGHT. Three months ago.

Mr. BRUSH. That was arranged between our vice president and counsel, Mr. P. O. Knight, and the attorneys of the Fleet Corporation.

Mr. KNIGHT. The option was originally of doubtful validity.

Mr. BRUSH. So that the Government has that option now for the land. Here [see illustration, p. 393] are your piers; and here [indicating] is your terminal. Here [indicating] is the end of your ways; there [indicating] is where your piers end. There are seven piers 1,000 feet long and 100 feet wide.

The CHAIRMAN. And there are two boats in it?

Mr. BRUSH. There are four boats lying at that pier now. There are three boats lying at that pier [indicating]; on the east side of Pier B [indicating] is a 100-ton crane that can be used for loading heavy articles of cargo; and I do not know of any docks that have any crane as big as that. Incidentally, here [indicating] is the 81.14 acres of land that Senator Ransdell asked about.

Senator RANSDELL. That is just across the river, is it?

Mr. BRUSH. No; it is at right angles to the marginal wharf out into the river at the west end of the property, and is what was known as our west impounding basin.

Senator RANSDELL. And you could build more piers there if you needed them, could you not?

Mr. BRUSH. Yes, sir. But I wanted to make clear the capacity of those docks. We have four steam railroad tracks and two gantry crane tracks down the entire length of each dock.

Senator RANSDELL. What is the space between those piers; from basin to basin, how many feet is it?

Mr. BRUSH. Two hundred and sixty-six feet between your piers.

Senator RANSDELL. And that is plenty of space to load commercially, is it?

Mr. LEVY. The Bush Terminal at New York has slightly less than that.

Senator RANSDELL. It is substantially the same as at the Bush Terminal?

Mr. LEVY. It is a little more.

Mr. BRUSH. The east side of that 81.14 acres [indicating] can be used to construct a huge dock which can be used, if you see fit.

The CHAIRMAN. Where are your concrete ways?

Mr. BRUSH. Right here [indicating]; our second group of 10 ways. Now here [indicating] is a picture of Bush Terminal.

Senator RANSDELL. I wanted to have that clear, because I have heard it said that they really could not use it commercially very well.

Mr. BRUSH. Here [indicating] is a picture of the Bush Terminal.

Senator RANSDELL. That is that famous terminal in Brooklyn, is it?

Mr. BRUSH. Yes, sir; and here [indicating] is the blue print that goes with it.

Senator RANSDELL. Do you know the width between the basins there?

Mr. BRUSH. It is a little more than 200 feet.

Mr. LEVY. Let me explain that. The blue prints I had indicated that it was about 250 feet, but that showed the distance, as I figure *on* the print, inside the building line, while ours are 266 feet from the outside of the piers. So I say they are substantially the same.

Senator RANSDELL. They are substantially the same. Of course, this [indicating] has buildings on it, and yours has not; it would be a simple matter to put the buildings up.

Mr. BRUSH. We could not have buildings on it while we were outfitting the ships.

Senator RANSDELL. Yes; I know you could not now; but if you wanted to use it commercially, it would be feasible.

Mr. BRUSH. Yes.

The CHAIRMAN. Practically all that you would have to do is to construct a shed on them.

Mr. BRUSH. Mr. Chairman, I am afraid I have taken more time than I should have taken.

The CHAIRMAN. Does any member of the committee desire to ask Mr. Brush any questions? If not, we will hear Mr. Pierce and then go into executive session.

Mr. BRUSH. This is Mr. Walker C. Pierce, who was chief engineer of the *Quistconck*, representing the American International Shipbuilding Corporation when she was turned over to the Fleet Corporation, he having been on the ship from the time they started the machinery installation. Now, tell the committee exactly what you did, Mr. Pierce.

STATEMENT OF MR. WALKER C. PIERCE, CHIEF ENGINEER OF THE STEAMSHIP "QUISTCONCK."

Mr. PIERCE. We have all heard of the false report concerning the *Quistconck*. I was chief engineer of the *Quistconck* from the time she made her trials up to the time she was turned over to the Shipping Board. I also went along, representing the shipyard, on her voyage, and I left the ship last Monday at New Orleans.

We heard a lot of reports about the ship being in a sinking condition, leaky, etc. I watched the ship very closely, and we have never even had to pump any water out of the ship from the time we left Hog Island, so that the ship must be pretty tight when we did not have to pump any water out of her.

And so far as the engine room is concerned, you could not get a ship to work any better. She has 15 burners under her boilers. We

had 3 burners to spare. The ship was equipped with blowers, but we never had to use the blowers.

Senator RANSDELL. Do you use oil on that ship, or coal?

Mr. PIERCE. We use oil. With four burners lit under each boiler you could get all the steam you wanted. So that there is one boiler shut off under natural draft.

Senator RANSDELL. When did you start in on the ship?

Mr. PIERCE. I started in on the ship about six weeks after she was launched from the ways.

Senator RANSDELL. When she was in the pier being fitted up?

Mr. PIERCE. Yes; the wet basin. And I supervised the installation of all the machinery—boilers, engines, pumps, etc.

Senator RANSDELL. And you have been associated with the ship up to the present time?

Mr. PIERCE. Yes; I acted as chief engineer when she went on her trial trip. I stayed on her as chief engineer up to the time she was taken over by the Shipping Board; they then put their own chief engineer on board. I went along with the ship, representing the shipyard, and I left the ship at New Orleans last Monday. When I left the ship they were loading 1,800 tons of car rails into her; they were going to finish the cargo with cotton and tobacco and send her to Genoa, Italy.

Senator RANSDALL. What actual voyage did you make on the ship?

Mr. PIERCE. After the ship was turned over to the Shipping Board the Shipping Board crew was put aboard of her, and we went out on a 24-hour trial trip, with the Shipping Board crew aboard. We came back to Lewes, Del.; anchored there about three days waiting for orders from the Shipping Board; we received orders to proceed to Norfolk, Va., to get a cargo of coal and take it to Cristobal, Panama. After we discharged the coal at Cristobal she lay at anchor several days waiting for orders from the Shipping Board. Finally orders came to proceed to New Orleans for further orders. We went to New Orleans——

Senator RANSDELL. Empty?

Mr. PIERCE. Yes, sir; in ballast. And the ship is now at New Orleans being loaded for Genoa, Italy.

The CHAIRMAN. In all those voyages, did you have any trouble with your ship in navigating her?

Mr. PIERCE. Not a thing. The ship went right along fine.

The CHAIRMAN. Did your rudder work all right?

Mr. PIERCE. Fine; never had a bit of trouble.

Senator RANSDELL. Was there any trouble of any kind that you could suggest?

Mr. PIERCE. No, sir.

The CHAIRMAN. Has she been in dry dock since she left?

Mr. PIERCE. She has never been in dry dock from the time she was launched. I went into the ship six weeks after she was launched.

Senator RANSDELL. What caused all this talk about having to rivet her?

Mr. PIERCE. I can only say that when she was launched there was a lot of riveting incomplete in the tank and around the superstructure, which is now done on the ships when they are on the ways, but which was not done when this ship was on the ways, and when she came to the wet basin that left that much more work to be done.

Senator RANSDELL. That was in the tanks and superstructure, you say?

Mr. PIERCE. Yes, sir. The hull was finished and was perfectly tight.

Senator RANSDELL. She did not leak any?

Mr. PIERCE. Not a drop; and there has not been anything done to the hull since she was launched. The only thing that was done to the ship any more than the other ships was that the tanks were not as complete and the upper works were not as complete as the ships that are now coming down from the ways.

Senator VARDAMAN. In what way were they not as complete?

Mr. PIERCE. They were not as completely riveted, especially around the tank tops.

Senator VARDAMAN. How long would it take to do that?

Mr. PIERCE. I can not tell you that offhand, but there was more work done in the way of riveting——

Senator VARDAMAN (interposing). How long did it take after the ship was launched before she was seaworthy?

Mr. BRUSH. Do you mean if she is carried as we now carry them on the ways?

Senator VARDAMAN. No; I want to know how long after the ship was launched before she was ready to go to sea.

Mr. BRUSH. I can give you that information. She was launched August 5 and she was accepted December 3. That was 120 days.

Senator VARDAMAN. One hundred and twenty days in the wet basin after she was launched?

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. What were you doing during that time?

Mr. PIERCE. When she was brought down to the wet basin the pumps were installed, the gears and line shaft were installed, and the tank tops were riveted, and the superstructure, the decks, etc., were riveted, but nothing was done to the hull.

Senator VARDAMAN. The hull was sound, was it?

Mr. PIERCE. The hull was complete when she came down, and there was nothing more done to it. It was all in the superstructure and around the crew's quarters, and around the bridges and tank tops.

Senator VARDAMAN (interposing). And it required 120 days to finish that up?

Mr. PIERCE. I believe it was around that time.

Senator VARDAMAN. Did you go on the ship when she was first launched?

Mr. PIERCE. I went on the ship six weeks after she was first launched. I saw her launched, but I was on one of the other ships.

Senator VARDAMAN. You did not see it, then. You did not go on the ship until six weeks after she was launched?

Mr. PIERCE. But the day she was launched I was sent by the superintendent of outfitting to go to the ship, down in the wet basin, and try to see if she was leaky.

Mr. BRUSH. Did you ride on her?

Mr. PIERCE. No, sir; but as soon as she got to the dock I went into the hull and looked all the tanks and bilges over to see if there were any leaks, and I could not see any from stem to stern.

Mr. BRUSH. How many hours was that after she was launched?

Mr. PIERCE. That was three or four hours after she was launched.

The CHAIRMAN. You say they had no trouble with the gears or turbines or anything of that kind?

Mr. PIERCE. No, sir. Just before I left the ship last Monday I opened up the gear cases, and the gears looked as fine, after that ship had gone 4,000 miles, as when they were put in.

The CHAIRMAN. Mr. Pierce, I do not know whether you have had experience with other ships and looked over other ships or not, but I have been told that these ships that we are building at Hog Island are better equipped and have more generous and better accommodations for crew and officers, and the furnishing of the ship is superior to the cargo ships of any other country.

Mr. PIERCE. I believe that is true, Mr. Chairman.

One little thing I would like to mention, Mr. Chairman: We had a General Electric man along with us this time, and there had been lots of trouble with gears in other ships, and turbines in other ships. We had a General Electric man along; he wanted to take the amount that the gear had vibrated fore and aft, and he intended to rig up a sort of dictograph to record the amount of vibration. But he came to me and said, "There is no use putting that up; it is the best job I have ever seen. I have been following this game with the General Electric Co. for 12 years, and that is one of the best installations I have ever seen. It is not worth while putting the rig up." And he did not even come from Cristobal to New Orleans with the ship; he came up on the *Victoria.* He said there was no use of his staying on the ship any longer.

Senator VARDAMAN. Who was that?

Mr. PIERCE. It was Mr. A. C. Lieshmann.

Senator VARDAMAN. Who is he?

Mr. PIERCE. The representative of the General Electric Co., who built the turbines.

The CHAIRMAN. I think that is all. Mr. Brush, what do you know about having trouble with the turbines at other places?

Mr. PIERCE. I would like to answer that question, Mr. Chairman. A great deal of the trouble that occurred has come from nonalignment; that is, the turbines and the line shaft were not properly in line, and if they are not properly in line the turbine will vibrate. In all the ships that we have put out so far from Hog Island the turbines run so nice and smooth that you can stand a coin on them; they do not vibrate at all.

Mr. BRUSH. In answer to your question, Mr. Chairman, I will say that the only other plants with which I am at all familiar are, first, one other fabricating plant on the Delaware River, the Merchants' Shipbuilding Corporation; and second, the plant up at Newark, N. J., the Submarine Boat Co. And I only know of those through hearsay. But I believe that the Submarine Boat Co. have delivered one boat, the *Agawam;* the last we heard of it she was at the Bermuda Islands; they have delivered no other boats to my knowledge.

The other fabricating plant, the Merchants' Shipbuilding Corporation, at Bristol, have not delivered any boats. They have had a very difficult and a very discouraging and heart-breaking time with their gears, and as to just where they stand now I can not say, except that I understand that their first boat, the *Watawan,* which I saw

go down on her trial trip back in November, has no working gears in her now; and they are trying to install some other gears in her.

The CHAIRMAN. Who furnished the gears for those ships?

Mr. BRUSH. I understand they were supplied from another manufacturer by the Fleet Corporation.

Senator RANSDELL. They were purchased by the Emergency Fleet Corporation also, I presume.

Mr. BRUSH. Yes, sir; the same as ours were supplied. But we did this, Mr. Chairman, which I think is a credit to those boys who are doing the work at Hog Island—and they are the boys who are entitled to all the credit for this work, anyhow. One of the first things I did when I got to Hog Island was to go down to the turbine and gear house on the dock. I had had considerable experience with gears and turbines, and I found there that we were working on the gears and turbines as they were delivered to us, and we would do a certain amount of cleaning, etc., which I did not feel it was our province to do; we were buying those gears from a reputable concern, and I assumed that they ought to furnish them the same as we would buy the works of a watch.

And I went to the chairman of the board of the company that furnished them, and I told him that I believed he had a great deal at stake in seeing that these things worked right and were delivered to us right; that we would guarantee that they would be put up right if they were delivered to us right. And he took the position that I could have any man in his company, or any number of men in his company, to do anything I wanted them to do and at his expense and not at the expense of the Government nor at our expense. And he turned over to me one of the best turbine and gear men he had. And we turned all of our men out of the turbine and gear house and turned it over to him.

We do not allow a gear or turbine out of that house unless it is in as good condition as the inside of a watch. As Mr. Pierce said, we take the utmost care in setting up our turbine. The turbine is in the forward part [indicating]. First come your boilers and then your turbine. It is not on a concrete foundation; it is on a steel foundation and you have the flexibility of steel. That connects up just like the gears under the driver's seat in an automobile; we reduce the number of revolutions per minute by engaging a small pinion here [indicating], which engages a big pinion here [indicating]; and there is a pinion here [indicating] which comes from a big gear, so that you reduce that from 3,600 revolutions down to 100 revolutions. And that must be lined absolutely right. There is a shaft which goes into the thrust bearing, and that must be lined absolutely right.

And then you have about 142 feet of shafting varying from 12⅝ inches to 14½ inches in diameter to the stern of your ship, to your propeller.

Now, you must have, not theoretically, but absolutely a straight line from the front end of the shaft of your turbine to the center of your propeller, and if there is the slightest variation—those shafts are lined to the one-thousandth and a half of an inch, and if they are not exactly right they will run hot and you will have trouble. We have had no trouble of that character.

May I say one additional word?

The CHAIRMAN. Yes.

Mr. BRUSH. Of course, I was not connected with Hog Island until about six weeks ago. But I have been over Hog Island as carefully as a man can, and tried to get this thing together, and tried to reorganize our force to a peace basis, and tried to eliminate executive force and increase actual productive force.

I should never have gone to Hog Island or accepted this position—regardless of my story to Senator Vardaman—had I not had absolutely unqualified confidence that it was clean and sound and could be made a success. And I am perfectly willing to stake my reputation, not as a shipbuilder, but as an executive, that it can be made a success; and I am absolutely amazed at the tremendous volume of work that was done and the way in which it was done, and the earnestness of the boys on the ground who did the work. You have boys in that plant to-day who are absolutely groggy from having been there 16 months and working just as hard as human beings can work. It would be unfair for me to appear to represent the company in any way, shape, or manner and not give them full credit. I am entitled to no credit for it myself.

The CHAIRMAN. Senator Johnson, do you want to ask any questions?

Senator JOHNSON. Well, I am rather diffident about asking questions, because I owe you an apology, Mr. Brush, for not having been here during all your testimony; and ultimately I will read it anyway. That part of it which I have heard has been most interesting. But if you have stated what I am now to inquire about it is not necessary for you to state it again.

Mr. BRUSH. I will be glad to do what I can, Senator Johnson.

Senator JOHNSON. What date did you go to Hog Island?

Mr. BRUSH. The date I was elected president was December 13, 1918. Prior to that time I went there and hired out as a shipbuilder.

Senator JOHNSON. What was the first time you were ever at the island at all, in any capacity?

Mr. BRUSH. I visited the island purely as a visitor while I was president of a railroad, in the latter part of July last.

Senator JOHNSON. As a mere visitor?

Mr. BRUSH. With no intention or idea of ever being connected with the island.

Senator JOHNSON. You had nothing more than casual interest in the project at that time?

Mr. BRUSH. No, sir.

Senator JOHNSON. And it was as a matter of curiosity, I presume?

Mr. BRUSH. Well, curiosity and general interest in a project of that size.

Senator JOHNSON. Naturally.

Mr. BRUSH. And also my interest in Mr. Stone and Mr. Webster.

Senator JOHNSON. Your occupation prior to assuming your present occupation was what?

Mr. BRUSH. President of the Boston Elevated Railway Co.

Senator JOHNSON. You had been president of that road for how long?

Mr. BRUSH. From December 15, 1916, to October 15, 1918.

Senator JOHNSON. Your duties were those, I assume, of the usual president of a road?

Mr. BRUSH. Yes, sir. I handed in my resignation as president on July 1, at the time we turned the property over to the State of Massachusetts, and undertook to leave there at once, and I was requested by the trustees appointed by the Governor to remain with them, and I agreed to remain until they could select my successor. I continued to do that until October, when my resignation was accepted.

Senator JOHNSON. Do you know how your selection came about as the manager, or the president, or the executive officer at Hog Island?

Mr. BRUSH. I had known Mr. Stone ever since I entered college in 1897, 21 years ago. He is a Boston Tech man and so am I. I have known Mr. Stone and Mr. Webster and a great many of the officers and subordinates of the Stone and Webster organization as a college and a railroad man.

Senator JOHNSON. Is it not a fact that you were selected because the management had not been satisfactory prior——

Mr. BRUSH (interposing). That I could not answer.

Senator JOHNSON. Was that not stated to you?

Mr. BRUSH. No, sir; what was stated to me was—I had no idea of going to Hog Island, nor did Mr. Stone or his directors have any idea of sending me to Hog Island. I was employed by the American International Corporation as vice president, which position I still hold, and I went to New York. I had no idea of going to Hog Island.

Senator JOHNSON. When was that particular employment?

Mr. BRUSH. October 15, at the time I resigned from the Elevated.

Senator JOHNSON. October 15, 1918?

Mr. BRUSH. Yes, sir.

Senator JOHNSON. That employment came from whom?

Mr. BRUSH. From Mr. Stone and the board of directors of the American International Corporation.

Senator JOHNSON. Then in December you assumed your duties at Hog Island, in the capacity of chief executive there?

Mr. BRUSH. Yes, sir.

Senator JOHNSON. Were you not aware of any defects in the management just preceding yours?

Mr. BRUSH. No, sir; I was told by Mr. Stone that my predecessor, who was Mr. Frederick Holbrook, whom I had known of in Boston as a member of the firm of Holbrook, Cabot & Rollins—I had known Mr. Rollins for years, but not Mr. Holbrook—I was told by Mr. Stone that he wanted me to go down to Hog Island in November and look it over. I came down to Hog Island and hired out as a shipbuilder; and I qualified as a shipbuilder, provided I would go to school for 10 days after I got there.

Subsequent to that I went through the island as an observer, and as an officer of the company that owned the company that was running it. And, later Mr. Stone came to me, and told me that Mr. Frederick Holbrook, who had formerly been in Russia for the American International Corporation, and for his own interest, desired to return to Russia; that he had always wanted to do so, and since the armistice he was more anxious than ever to do so. He asked me to go down to Hog Island and take the presidency.

Senator JOHNSON. Well, up to the time of your novitiate in November, had you had any experience in shipbuilding?

Mr. BRUSH. No, sir; I am not a shipbuilder in any way, shape, or manner.

Senator JOHNSON. Was that your first experience when you went down there to qualify yourself?

Mr. BRUSH. Yes, sir.

Senator VARDAMAN. I think it is due to you, Senator Johnson, that you should know that Mr. Brush is an engineer who has given a great deal of his life to work very similar to the construction work that they are doing at Hog Island. He gave a short biographical sketch of himself, which you will find in the record.

Senator JOHNSON. Well, when you went there in the capacity you suggested, had you any idea that you were going to that position?

Mr. BRUSH. You mean when I first went to New York?

Senator JOHNSON. Yes.

Mr. BRUSH. No, sir.

Senator JOHNSON. That was a subsequent matter to determine?

Mr. BRUSH. I first went to Hog Island in the same capacity in which I was serving with the American International Corporation, in looking into other of its properties. I was employed by that company to go in there, as an executive, to add my experience as an executive and my experience in handling men, as well as my experience as an engineer.

Senator JOHNSON. I suppose in your testimony you have stated your salary?

Mr. BRUSH. No; but I shall be very glad to do so.

Senator JOHNSON. What is it?

Mr. BRUSH. $40,000 a year.

Senator JOHNSON. Paid by the Government?

Mr. BRUSH. No, sir; paid by the American International Corporation.

Senator JOHNSON. Well, is any part of it paid by the Government?

Mr. BRUSH. Not a cent.

Senator JOHNSON. None whatever?

Mr. BRUSH. Not even the expenses of the automobile I drive.

Senator JOHNSON. You, and you alone, pay those expenses?

Mr. BRUSH. No, sir; all the vice presidents and the treasurer are paid by the American International Corporation. There is a letter to Senator Fletcher on file, which is contained in the printed record of September 20, 1918, from Mr. P. O. Knight, our vice president and general counsel, in which he explains that.

Senator JOHNSON. You have been talking of the accomplishments at Hog Island, and the great work done there, and the like; and it seems to me that you are hardly qualified to testify concerning that, until the time when you went in there, except, of course, by obvious deduction and by inference.

Mr. BRUSH. Well, for instance, in the last five days of December we launched five boats. Since December 3, when they delivered the *Quistconck*, they have delivered four more, the fifth one last night; and they have launched 13 in addition to that one, which makes a total of 14. Now, I, with all the speed in the world, with superhuman power, could not have accomplished that since Decem-

ber 13, when I went in, unless there had been a tremendous job done before that.

Senator JOHNSON. That is true.

Mr. BRUSH. I am entitled to no credit, except for getting the team together—and I am proud of that.

Senator JOHNSON. How long will it be before you complete your contract?

Mr. BRUSH. I can not tell you. We will do everything on earth to produce those ships as fast as we can, consistent with efficiency and economy. I have discussed that with Mr. Piez.

Senator JOHNSON. Can you give any approximation of the time that you will have them delivered?

Mr. BRUSH. I think it would be very unfortunate for me to guess at it at this stage of the game. I think I will be enabled to give a very much more reasonable opinion later.

Senator JOHNSON. I think you are right about that, because the statements that have been made as to deliveries have been, in most instances, wholly erroneous.

Mr. BRUSH. I explained to Senator Jones that I was a great believer in doing a thing and asking you to pat me on the back for doing it, rather than telling you what I am going to do. And I would rather——

Senator JOHNSON (interposing). That may have been one of the difficulties at Hog Island before you went there.

Mr. BRUSH. Well, I have been fortunate in this respect: I have gone so far, Senator Johnson, as to persuade the entire board of directors in New York to let me get away with what I have told you; and I have given them no further answer, and Mr. Piez has agreed to it; and they have said, "Go back and build ships;" and that is what I am going to do.

Senator JOHNSON. Well, you are on the job and are delivering ships.

Mr. BRUSH. I am trying to, Senator.

Senator JOHNSON. Well, I presume you would not want to, and I will not ask you——

Mr. BRUSH [interposing]. Go ahead, Senator.

Senator JOHNSON (continuing). To speak of your predecessors and their various works and extravagances?

Mr. BRUSH. Well, let me say this, if I can read your mind as to your thought: I am, of course, a tremendous admirer of Stone & Webster. I have known them for years. I believe they are absolutely on the level, and I believe they are big, competent, reliable engineers and executives.

Senator JOHNSON. Well, that is not the point of controversy, if there is any——

Mr. BRUSH (interposing). Well, I may be prejudiced, of course, on the question of their ability and integrity; and I am naturally prejudiced; as a man in my position, I should not have been with the institution if I had not believed as I do.

Senator JOHNSON. I think you are quite right about that; and if I were in your situation I think I would be quite as much prejudiced, or more so.

Mr. BRUSH. I am in Hog Island, Senator Johnson, for this reason—may I say this, please?

Senator JOHNSON. Say anything you wish.

Mr. BRUSH. I have just finished a job in Boston with the public utilities, where we have probably saved from a possible receivership $132,000,000 of citizens' money, widows' and orphans' money——

Senator JOHNSON (interposing). God bless you, then.

Mr. BRUSH (continuing). And savings-bank money; and it is the only street railway that I know of in the United States of America that to-day is not substantially bankrupt. There are 6,000 stockholders in the Boston elevated, and the average holding is 44 shares. Now, I remained with that property two years after Mr. Stone had offered me twice as much as I was getting, because I was 38 years old when I became president of the railroad, and I was going to finish the job; and I did. When we finished the job, I did not care to work for the State of Massachusetts in just that way, regardless of the compensation, and I resigned. Now I want to do another job, and then I want to get a better one.

Senator JOHNSON. You have done well; and I have listened to you with the utmost approval, mentally. Do not spoil it now. That is all I wish to say.

Mr. BRUSH. Thank you, Senator Johnson.

The CHAIRMAN. Now we will have an executive session.

(Thereupon, at 4.30 o'clock p. m., the committee proceeded to the consideration of executive business, and at 4.50 p. m. adjourned to meet subject to the call of the chairman.)

O

LIBRARY OF CONGRESS
0 013 358 398 1